

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. 5-01-105

WASTE DISCHARGE REQUIREMENTS
FOR
CITY OF BAKERSFIELD
WASTEWATER TREATMENT PLANT NO. 3
KERN COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Board) finds that:

1. The City of Bakersfield (hereafter Discharger or City) owns and operates Wastewater Treatment Plant No. 3 (WWTP No. 3), an existing wastewater treatment facility (WWTF) that serves commercial, industrial and residential developments in the incorporated area of Bakersfield west of Highway 99, both north and south of the Kern River, and the incorporated area of the City south of White Lane and east of Highway 99. The WWTF is southwest of the City and occupies the northeastern quarter of a 640-acre, City-owned parcel that comprises all of Section 33, T30S, R27E, MDB&M, as shown in Attachment A, a part of this Order. Within this 640-acre parcel, the Discharger recycles up to 730 million gallons of WWTF effluent annually on 400 acres (hereafter Use Area), as shown in Attachment A.
2. Waste Discharge Requirements (WDRs) Order No. 88-167, adopted by the Board on 23 September 1988, currently prescribes requirements for a 30-day average daily dry weather discharge of 16.0 million gallons per day (mgd) following the completion of an expansion in April 1999.
3. The Discharger also recycles WWTF effluent on a 4,700-acre site about eight miles southwest of the WWTF bounded by Highway I-5 on the east, Enos Lane on the west, and Taft Highway on the north. The Discharger has a long-term contract with the City of Los Angeles to receive WWTF effluent at this site (hereafter referred to as the I-5 Site). The I-5 Site includes all land in Sections 1 and 12, T31S, R25E, MDB&M, and all or portions of land in Sections 5, 6, 7, 8, 9, 15, 16, 17, and 18, T31S, R26E, MDB&M, as shown in Attachment B, a part of this Order. The I-5 Site has a reported disposal capacity of 20 million gallons per day (mgd) and is regulated by Water Reclamation Requirements (WRRs) Order No. 88-172 and Special Order No. 94-366. Order No. 88-172 specifies 30-day average and peak daily discharge limits to the I-5 Site of 14.0 mgd and 20.0 mgd, respectively.
4. The Use Area also receives up to 0.65 mgd of high-strength industrial wastewater from a manufacturing plant that produces baker's yeast. From 1972 to 1983, the yeast plant discharged its wastewater to WWTP No. 3. Excessive organic loading from the yeast plant resulted in nuisance odor conditions and violations of discharge limits for organics and suspended solids. To eliminate the yeast plant's discharge to the WWTF, the City and the yeast plant's owner (then Busch Industrial Products Corporation) entered into an agreement to land apply the yeast plant's discharge directly to the 400-acre Use Area. The discharge of WWTF effluent and yeast plant wastewater to the Use Area is currently regulated by two orders adopted by the Board on 28 January 1983: Waste Discharge Requirements Order No. 83-016 and Wastewater Reclamation Requirements Order

No. 83-017, both for Busch Industrial Products Corporation, Mr. John Stanley Antongiovanni, and City of Bakersfield. The yeast plant is currently owned and operated by the American Yeast Company (AYC). The Board revised Monitoring and Reporting Program (MRP) No. 83-016 to increase the number and frequency of monitored constituents and to require periodic EC monitoring of AYC's source water and discharge. By authorizing the change in yeast plant discharge from the WWTF to the City-owned Use area, the City is responsible for ensuring that the discharge to land of industrial waste is conducted in a manner that is consistent with the California Water Code, Board plans and policies, and the terms and conditions of Board-adopted waste discharge requirements.

5. Order No. 88-167 is subject to and due for periodic review, as are Order Nos. 83-016 and 83-017. The purpose of this Order is to rescind the previous Order and update waste discharge requirements, in part, to ensure the discharge is consistent with Board plans and policies and to prescribe the requirements that are effective in protecting existing and potential beneficial uses of receiving waters. This Order prescribes terms and conditions for the recycling of WWTF effluent and the discharge of yeast plant wastewater to the Use Area. This Order does not rescind Order Nos. 83-016 and 83-017, but does prescribe more stringent requirements for the discharge of WWTF effluent and yeast plant wastewater to the Use Area, including annual load limits for nitrogen.

Existing Discharge

6. The WWTF has a design capacity of 16.0 mgd and includes two bar screens, a wet well, two aerated grit chambers, four primary clarifiers, four trickling filter units, four secondary clarifiers, four effluent storage reservoirs (total capacity of 1,000 acre-feet), six anaerobic digesters, an effluent equalization lagoon, and approximately 20 acres of unlined sludge drying beds. The equalization lagoon is lined on the sides and has a compacted bottom. The storage reservoirs are not lined or compacted for low infiltration rates, but are generally dry for about eight months of the year when irrigation demand exceeds WWTF flow and effluent may be routed directly to the reclamation lands or to the equalization lagoon for distribution to reclamation lands. The WWTF layout and flow diagram are shown in Attachments C and D, respectively, parts of this Order.
7. Based on year 2000 Discharger self-monitoring reports (following completion of the WWTF expansion), the WWTF flow and influent and effluent constituent concentrations have averaged as follows:

<u>Constituent/Parameter</u>	<u>Units</u>	<u>Influent</u>	<u>Effluent</u>
Flow	mgd	11.4	--
BOD ₅ ¹	mg/L	396	45
CBOD ²	mg/L	--	20
EC ³	µmhos/cm	--	654
Settleable Solids	ml/L	8.5	0.06

See footnotes next page

¹ Five-day biochemical oxygen demand at 20°

² Five-day carbonaceous biochemical demand at 20°C

³ Conductivity at 25°C

8. Discharger monitoring reports for 1998 and 1999 show that winter flows are not higher than summer flows, indicating there is no significant inflow and infiltration to the WWTF collection system during winter months.
9. The WWTF received about 5 million gallons of septage in 1999 and 1.6 million gallons during the first four months of 2000. The typical range of BOD₅ for septage is 2,000 to 30,000 mg/L. Accordingly, the Discharger's acceptance of septage at the WWTF obviously increased the WWTF's influent BOD₅. Because of elevated effluent BOD₅ concentrations, the Discharger has directed all septage since July 2000 to the City's WWTF Plant No. 2. However, the Discharger's 2000 Annual Report indicates that the influent BOD₅ has remained above the WWTF design criteria of 304 mg/L. The average influent BOD₅, as shown in Finding No. 7, was 396 mg/L, while the average effluent BOD₅ concentration exceeded 40 mg/L.
10. Source water for the City and environs is supplied by seven separate water systems, two of which are supplied by surface water treatment plants and the remainder by municipal groundwater wells. The weighted average EC of source water for the WWTP No. 3 service area between April and September 1999 was about 270 µmhos/cm, according to data submitted by the Discharger.
11. The Discharger has not submitted for WWTP No. 3 a Notice of Intent to comply with the latest *Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activities Excluding Construction Activities* (97-03-DWQ), which is required if storm water is not retained onsite. Alternatively, the Discharger provided a letter, dated 8 May 2000, signed by registered Civil Engineer with the State of California, verifying that all storm runoff remains onsite.

Pretreatment

12. The City has conducted five Industrial Waste Surveys to identify all potential industrial users in the following categories: vehicle services; photo-processors; dry cleaners; and pesticide formulating, packaging and repackaging facilities (PFPRs). The Discharger's 1998 Annual Pretreatment Report (Report) indicates that in 1998 the City conducted 23 inspections of vehicle service shops and six inspections of potential PFPRs, revised two permits for laundry facilities, issued three new permits to photo-processors, and reviewed 1,801 new or renewed business licenses to identify potential significant industrial users. The Report indicates that two significant industrial users (SIUs) discharge waste into the WWTF collection system, one of them a dairy processing plant.
13. The United States Environmental Protection Agency (EPA) promulgated General Pretreatment Regulations for existing and new sources of pollution, codified in Title 40, Code of Federal Regulations (40 CFR), Part 403. According to an agreement between the State Water Resources Control Board and EPA, the Board adopted Special Order No. 85-244 on 27 September 1985, which amended waste discharge requirements to revise pretreatment provisions for the WWTF, WWTP No. 2, and four other publicly owned wastewater treatment facilities. The State Water

Resources Control Board and regional water quality control boards received authority from the EPA to administer the Pretreatment Regulations on 25 September 1989. Special Order No. 85-244 is no longer necessary for Bakersfield, due to this update.

14. The EPA approved the City's pretreatment program on 15 October 1985. The City adopted a revised sewer code with local limits on 30 August 1995 (effective on 15 November 1995) and the Board adopted Resolution No. 96-041, *Approving the Program Modification for Revised Legal Authority for the City of Bakersfield Pretreatment Program*, on 23 February 1996.
15. Following a staff audit of the City's pretreatment program in June 1996, the Board issued the City a Notice of Violation for not fully implementing the programmatic functions and providing the requisite funding and personnel as required by 40 CFR 403.8(f)(2) and 403.8(f)(3). In response, the City submitted a final Action Plan in May 1998 identifying the City's completed actions, which included surveying industrial waste discharges and hiring industrial waste inspectors.
16. According to graphical data in the 1998 Annual Pretreatment Report, levels of cadmium, lead, and silver in WWTF sludge decreased between 1994 and 1998. The Report attributes the decrease to the inclusion of permitting criteria and permit issuance for photo-processors in 1996, conversion to zero discharge systems at radiator repair shops, and the implementation of an inspection and sampling plan for vehicle service facilities and machine shops.

Sludge Management and Biosolids Disposal

17. Sludge as used herein means the solid, semisolid, and liquid residues generated during the treatment of industrial and domestic sewage in a municipal WWTF. Sludge includes solids removed during primary, secondary, or advanced wastewater treatment processes, but not grit or screening material generated during preliminary treatment. Biosolids as used herein mean sludges that have undergone treatment and subsequently been tested and shown to be capable of being beneficially and legally used pursuant to federal and state regulations as a soil amendment for agriculture, silviculture, horticulture, and land reclamation.
18. Pursuant to section 13274 of the California Water Code (CWC), the State Water Resources Control Board adopted on 17 August 2000 Water Quality Order No. 2000-10-DWQ, *General Waste Discharge Requirements for the Discharge of Biosolids to Land for use as a Soil Amendment in Agricultural, Silvicultural, Horticultural, and Land Reclamation Activities* (hereafter General Biosolids Order).
19. The Discharger disposes of about 2,400 tons of WWTF biosolids annually by land application to 5,100 acres of City-owned agricultural land, which is leased by Gary Garone Farms (formerly Garone Farm and Cattle Inc.). Discharge of biosolids to the City-owned land will be regulated separately through the General Biosolids Order. Gary Garone Farms also receives biosolids and up to 19 mgd of treated wastewater from the City's WWTP No. 2. The discharge of biosolids and treated wastewater from WWTP No. 2 to Gary Garone Farms is regulated by WRRs Order No. 82-049 for Gary Garone Farms, and WDRs Order No. 97-104 for WWTP No. 2.

20. The City's *Final Biosolids Management Plan (BMP)*, dated 26 September 1997, describes the City's management plan for biosolids applied to Garone Farms from both WWTP No. 2 and the WWTF. The BMP indicates that the Discharger (a) conducts quarterly sampling of WWTF biosolids to be applied to Garone Farms, (b) monitors the cumulative loading of metals in biosolids applied to Garone Farms pursuant to 40 CFR, Part 503, and (c) applies biosolids to Garone Farms at rates within crop nitrogen demand. The Discharger currently is not required to submit monitoring results for WWTF biosolids, however it does include quarterly metals concentration analyses results in its annual pretreatment reports.

Use Area

21. The Discharger recycles, on average, about 2 mgd of effluent on the Use Area, or up to 730 million gallons per year. For the year 2000, the Discharger recycled about 509 million gallons, which resulted in an annual nitrogen load to the Use Area from applied recycled water of 195 pounds per acre (1b/ac).
22. Bermuda grass is grown on the Use Area and reportedly harvested about once every 40 days. Published estimates of the annual nitrogen uptake by Bermuda grass varies with the particular variety of the grass and ranges from about 225 to 400 lb/ac.
23. Domestic wastewater contains pathogens harmful to humans that are typically measured by means of total or fecal coliform, as indicator organisms. The California Department of Health Services (DHS), which has primary state-wide responsibility for protecting public health, has established statewide reclamation criteria in Title 22, California Code of Regulations (CCR), section 60301 et seq., (hereafter Title 22) for the use of recycled (or reclaimed) water and has developed guidelines for specific uses. Revisions to the water recycling criteria in Title 22 became effective on 2 December 2000. The revised Title 22 expands the range of allowable uses of reclaimed water, establishes criteria for these uses, and clarifies some of the ambiguity contained in the previous regulations.
24. The 1988 Memorandum of Agreement (MOA) between DHS and the State Water Resources Control Board on the use of reclaimed water establishes basic principles relative to the agencies and the regional boards. In addition, the MOA allocates primary areas of responsibility and authority between these agencies, and provides for methods and mechanisms necessary to assure ongoing, continuous future coordination of activities relative to the use of reclaimed water in California.
25. Section 60323 of the RWC requires, for water reclamation projects, the submission of an engineering report (Title 22 Engineering Report) to the Board and to DHS. To assist in the development of a Title 22 Engineering Report, DHS has prepared *Guidelines For the Preparation of an Engineering Report For the Production, Distribution, and use of Recycled Water, September 1997*.

26. By letter dated 13 March 2000, DHS indicated that the Discharger has not submitted a Title 22 Engineering Report for its recycling of WWTP No. 3 effluent on the Use Area and the I-5 Site. The Discharger submitted the Title 22 Engineering Report on 16 March 2001.
27. As noted in Finding No. 4, the Use Area receives up to 0.65 mgd of industrial wastewater generated by the production of baker's yeast. Yeast is developed by aerobically combining a seed culture of baker's yeast and molasses and trace nutrients in batch conditions. The baker's yeast is then separated from the mixed culture by a vacuum type filter. The waste consists mostly of molasses and trace nutrients, about 6 to 7 percent solids.
28. Order No. 83-016, Finding No. 4, describes the yeast plant's discharge as being comprised of two separate waste streams — 'process wastewater' and 'first pass spent beer' — that, when combined, are characterized as having high concentrations of BOD₅ (4,600 mg/L) and total Kjeldahl nitrogen (285 mg/L). Order No. 83-016, Finding No. 6, indicates that the yeast discharge to the Use Area will result in an annual nitrogen load of about 1,200 lb/ac and a daily BOD₅ load of about 60 lb/ac. The same finding indicates that denitrification by soil bacteria should mitigate potential groundwater problems associated with the applied nitrogen.
29. Monitoring and Reporting Program No. 83-016 prescribes (a) monthly grab sampling of yeast plant discharge for BOD₅, nitrate-nitrogen, Kjeldahl nitrogen, and total nitrogen, (b) annual sampling of land application site soils for nitrate-nitrogen, Kjeldahl nitrogen, and total nitrogen, and (c) annual sampling of groundwater from approved wells for nitrate, chloride, pH and EC. The AYC also monitors WWTF effluent recycled on the Use Area for BOD₅, nitrate-nitrogen, Kjeldahl nitrogen, and total nitrogen.
30. The AYC monitors its discharge and WWTF effluent for the following constituents: calcium, magnesium, sodium, bicarbonate alkalinity, total suspended solids, ammonia-nitrogen, and chemical oxygen demand. The AYC monitoring data received for the year 2000 characterizes its yeast plant's wastewater and WWTF effluent discharged to the Use Area as follows:

<u>Constituent</u>	<u>Units</u>	<u>AYC Discharge</u>	<u>WWTF Effluent</u>
pH	pH units	5.2	7.7
Calcium	mg/L	304	38
Magnesium	mg/L	139	5.6
Sodium	mg/L	801	87
Bicarbonate alkalinity	mg/L as	1,180	210
Nitrate and nitrite	mg/L as N	23	10
Total Kjeldahl Nitrogen	mg/L as N	565	11
Ammonia	mg/L as N	18	7
Total Nitrogen	mg/L	606	28
Total Suspended Solids	mg/L	1,350	19
BOD ₅	mg/L	6,980	30

<u>Constituent</u>	<u>Units</u>	<u>AYC Discharge</u>	<u>WWTF Effluent</u>
Chemical Oxygen Demand	mg/L	18,300	87
Chloride ¹	mg/L	1,590	---
Inorganic Total Dissolved Solids ¹	mg/L	5,105	---

¹ Analyses conducted only in December 2000

31. As indicated above, the yeast plant's discharge contains high concentrations of total dissolved solids (TDS). Neither the findings nor the information sheet of Order Nos. 83-016 and 83-017 refer to the high TDS concentration of the yeast plant's discharge.
32. The nitrogen loading from AYC's discharge to the Use Area for the year 2000 was 1,550 lb/ac. Additional nitrogen loading from WWTF effluent recycled on the Use Area for 2000 was 195 lb/ac. Consequently, the total nitrogen loading to the Use Area from the commingled discharge of yeast waste and WWTF effluent in 2000 was 1,745 lb/ac.
33. The AYC recently collected data on EC and daily flows for five of its eight individual waste streams, but did not monitor EC during its weekly grab and 24-hr/7-day sampling (summarized in Finding No. 30). These five waste streams, when combined, account for about 0.252 mgd of AYC's current total average daily discharge of 0.442 mgd. A flow-weighted average of the EC of these five waste streams is about 10,500 μ mhos/cm. While the EC of all eight waste streams combined is uncertain, the remaining three waste streams reportedly do not contribute significant quantities of TDS. Based on this information (and assuming fixed or inert TDS is approximated by multiplying EC by 0.6), AYC's discharge to the Use Area results in a minimum salt loading of about 12,000 lb/ac/yr. Additional fixed TDS loading from WWTF effluent currently recycled on the Use Area is about 5,700 lb/ac/yr (given an annual recycle flow of 730 million gallons, an effluent EC of about 625 μ mhos/cm, and assuming fixed TDS = 0.6EC). Therefore, the total fixed TDS loading to the Use Area from AYC's discharge and WWTF effluent is about 17,700 lb/ac/yr.

Surface Hydrology and Soils

34. The WWTF and Use Area (hereafter referred to collectively as 'WWTF Site' or 'Section 33') are located on the Kern River alluvial fan within the Tulare Lake Hydrologic Basin, South Valley Floor Hydrologic Unit, Kern Delta Hydrologic Area (No. 557.10), as depicted on interagency hydrologic maps prepared by the California Department of Water Resources (DWR) in August 1986.
35. The WWTF Site has a nearly constant slope of approximately 10 feet per mile from north-northeast to south-southwest. One of the ancient Panama Slough channels runs northwest to southeast across the eastern half of Section 33. Under natural conditions, surface runoff from Section 33 would drain into the old Panama Slough channel into Sections 4 and 5 and continue to the southwest. Roads, ditches, and canal levees limit and alter surface flow, but general drainage is towards the Buena Vista Lake bed, the southern terminus of the Kern River, about nine miles southwest of Section 33.

36. The WWTF Site is in a semiarid region. Average annual precipitation and evapotranspiration are about 6 inches and 58 inches, respectively, according to information published by DWR.
37. The predominant soil association (Hesperia-Hanford) in the vicinity of the WWTF Site is considered to have moderate water infiltration rates. Soil profiles from 12 onsite bore holes (to a depth of 40 feet) indicate a variable lithology, but suggest that much of the site is underlain by a clay layer (generally over 5 feet thick) at about 25 to 40 feet below ground surface (bgs). A 50-foot-thick layer, termed the Corcoran Clay, underlies the entire region at over 400 feet bgs.
38. Since 1984, Use Area soil monitoring has involved collecting soil samples from eight locations within the Use Area from depths to six feet and analysis for soil nitrate and total nitrogen. As indicated by the summary of data below, there is some attenuation of soil nitrogen in the upper foot of Use Area soils. Below depths of two feet, however, the data indicate essentially homogeneous concentrations of soil nitrogen and less attenuation.

Summary of 1984 to
1999 data

		Soil Sample Depth (feet)			
	<u>Units</u>	<u>0-1</u>	<u>1-2</u>	<u>2-4</u>	<u>4-6</u>
Average Concentration					
Nitrate-nitrogen	mg/Kg	20	11	8	7
Total Nitrogen	mg/Kg	823	534	380	308
Average Percent Total					
Nitrate-nitrogen	%	43	24	18	15
Total Nitrogen	%	40	26	19	15

39. Use Area soil monitoring has also included monitoring for EC within the upper foot of Use Area soils. Data from 1984 through 1999 indicate that the EC of the upper foot of Use Area soils has ranged from 800 to 6,100 $\mu\text{mhos/cm}$ and averaged around 2,200 $\mu\text{mhos/cm}$. According to Western States Laboratory Proficiency Testing Program Soil and Plant Analytical Methods (1998), soils with EC ranging from 1,600 to 2,400 $\mu\text{mhos/cm}$ are moderately saline and show yield reductions of 50 percent in the most sensitive forage and field crops, and soil EC in excess of 3,200 $\mu\text{mhos/cm}$ are considered very strongly saline and support only a few highly salt-tolerant grasses, herbaceous plants and certain shrubs.

Basin Plan, Beneficial Uses, and Regulatory Considerations

40. The *Water Quality Control Plan for the Tulare Lake Basin, Second Edition* (hereafter Basin Plan), designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for protecting all waters of the basin, and incorporates by reference plans and policies of the State Water Resources Control Board. These requirements implement the Basin Plan.
41. The WWTF Site is on the Kern River alluvial fan, and has a nearly constant slope of about 10 feet per mile from north-northwest to south-southwest. Surface runoff is mostly by sheet flow between canal levees with a general drainage to the Kern River.
42. The Basin Plan identifies existing and potential beneficial uses of the Kern River below the Southern California Edison Kern River Powerhouse No. 1 as municipal and domestic supply, agricultural supply, industrial service supply, industrial process supply, hydropower generation, water contact recreation, noncontact water recreation, warm freshwater habitat, wildlife habitat, rare, threatened, or endangered species habitat, and groundwater recharge.
43. The Basin Plan identifies existing and potential beneficial uses of underlying groundwater as municipal and domestic supply, agricultural supply, industrial service supply, industrial process supply, water contact recreation, noncontact water recreation, and wildlife habitat.
44. Section 13050(h) of the California Water Code defines water quality objectives as "... the limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention or nuisance within a specific area."
45. The Basin Plan establishes numerical and narrative water quality objectives for surface and groundwaters within the basin, and recognizes that water quality objectives are achieved primarily through the Board's adoption of waste discharge requirements and enforcement orders. Where numerical water quality objectives are listed, these are the limits necessary for the reasonable protection of beneficial uses of the water. Where compliance with narrative water quality objectives is required, the Board will, on a case-by-case basis, adopt numerical limitations in orders which will implement the narrative objectives to maintain existing and anticipated beneficial uses of waters in the subject area.
46. The Basin Plan identifies numerical water quality objectives for waters designated as municipal supply. These are the maximum contaminant levels (MCLs) specified in the following provisions of Title 22, California Code of Regulations: Tables 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of section 64431, Table 64444-A (Organic Chemicals) of section 64444, and Table 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) and 64449-B (Secondary Maximum Contaminant Levels-Ranges) of section 64449. The Basin Plan's incorporation of these provisions by reference is prospective, and includes future changes to the incorporated provisions as the changes take effect. The Basin Plan recognizes that the Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses.

47. The Basin Plan contains narrative water quality objectives for chemical constituents in and toxicity of groundwater that address constituents in the discharge that are potentially harmful to beneficial uses. The toxicity objective requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in plants or animals. The chemical constituent objective states groundwater shall not contain chemical constituents in concentrations that adversely affect beneficial uses. Guidelines for identifying the quality of irrigation water necessary to sustain various crops were compiled by Ayers and Westcot in 1985 (Food and Agriculture Organization of the United Nations — Irrigation Drainage Paper No. 29). The Basin Plan recognizes these Guidelines for providing relevant numerical criteria to evaluate compliance with the previously described narrative water quality objectives. The Guidelines are intended for use in estimating the potential hazards to crop production associated with long term use of the particular water being evaluated. The Guidelines divide water quality characteristics as having “No Problem — Increasing Problems — Severe Problems” based on large numbers of field studies and observations, and carefully controlled greenhouse and small plot research. In general, crops sensitive to sodium or chloride are most sensitive to foliar absorption from sprinkler applied water. Bicarbonate has been a problem when fruit crops or nursery crops are sprinkler irrigated during periods of very low humidity and high evaporation. Below is a table of numerical criteria adapted from the Guidelines:

<u>Problem and Related Constituent</u>	<u>No Problem</u>	<u>Increasing Problem</u>
Salinity of irrigation water (µmhos/cm)	< 700	700 – 3,000
Specific Ion Toxicity		
from ROOT absorption		
Sodium (mg/L)	< 69	69 – 207
Chloride (mg/L)	< 142	142 – 355
Boron (mg/L)	< 0.7	0.7 – 3.0
from FOLIAR absorption		> 69
Sodium (mg/L)	< 69	
Chloride (mg/L)	< 106	> 106
Miscellaneous		
NH ₄ -N (mg/L) (for sensitive crops)	< 5	5 – 30
NO ₃ (mg/L) (for sensitive crops)	< 5	5 – 30
HCO ₃ (mg/L) (only with overhead sprinklers)	< 90	90 – 520
pH	normal range = 6.5 – 8.4”	

48. The existing and anticipated beneficial uses of area groundwater for agricultural supply include irrigation of crops sensitive to salt and boron.

49. According to the Guidelines, reductions in crop yields are not evident when irrigating most row crops with water having an EC of less than 1,100 $\mu\text{mhos/cm}$. The Guidelines also indicate that boron sensitive crops may show injury when irrigated with water with boron ranging from 0.5 to 1.0 mg/L and reductions in crop yields when irrigated with water with boron ranging from 1.0 to 2.0 mg/L. Bicarbonate has been a problem when fruit crops or nursery crops are sprinkler irrigated during periods of very low humidity and high evaporation.
50. To maintain the beneficial uses of flood and sprinkler irrigation of crops sensitive to salt and boron, it is necessary that area groundwater have EC values of 1,100 $\mu\text{mhos/cm}$ or less, and low concentrations of salt, chloride, sodium, boron, and bicarbonate.
51. As explained in the attached Information Sheet, this Order implements interim numerical water quality objectives to maintain existing and anticipated beneficial uses of area groundwater for the production of crops that are sensitive to salt (i.e., sodium and chloride), boron, or both. The numerical values reflect the level of quality necessary for sprinkler application, as these are more restrictive than for flood irrigation. These objectives include pH (6.5 to 8.5) and the following expressed as mg/L: chloride (106), sodium (69), boron (0.7), and bicarbonate (90). It is reasonable to conclude that the drinking water level of nitrate-nitrogen of 10 mg/L is adequately protective of existing and anticipated agricultural land uses.
52. The Kern Water Bank, a major groundwater recharge project involving approximately 24,000 acres, is west of Section 33 and north of the I-5 Site.
53. The discharge authorized herein and the treatment and storage facilities associated with the discharge, except for discharges of residual sludge and solid waste, are exempt from the requirements of Title 27, California Code of Regulations (CCR), section 20380 et seq. (hereafter Title 27). The exemption, pursuant to Title 27 CCR section 20090(a), is based on the following:
 - a. The waste consists primarily of domestic sewage and treated effluent;
 - b. The waste discharge requirements are consistent with water quality objectives;
 - c. The treatment and storage facilities described herein are associated with a municipal wastewater treatment plant.
54. California Water Code (CWC) section 13267 authorizes the Board to require anyone who discharges waste that could affect the quality of water, as the Discharger does, to furnish, under penalty of perjury, technical and monitoring program reports.
55. California Department of Water Resources standards for the construction and destruction of groundwater wells (hereafter DWR Well Standards), as described in *California Well Standards Bulletin 74-90* (June 1991) and *Water Well Standards: State of California Bulletin 94-81* (December 1981), and any more stringent standards adopted by the Discharger or county pursuant to CWC section 13801, apply to all monitoring wells.

56. State regulations that prescribe procedures for detecting and characterizing the impact of waste constituents from waste management units on groundwater are found in Title 27. While the WWTF is exempt from Title 27, the data analysis methods of Title 27 may be appropriate in some ways to determine whether the discharge complies with the terms for protection of groundwater specified in this Order.
57. In the process of crop irrigation, evaporation and crop transpiration remove water from and result in accumulation of residual salts in the soil root zone. These salts would retard or inhibit plant growth except for a fraction of irrigation water applied to leach the harmful salt from the root zone. The leached salts eventually enter groundwater and concentrate above the uppermost layer of the uppermost aquifer. As this is the general condition throughout the agricultural Tulare Lake Basin, water supply for all beneficial uses typically are constructed to extract groundwater from below this level.
58. Accordingly, monitoring of groundwater within the vicinity of the discharge should be by means of wells extracting water representative of the depth of the uppermost zone. Site-specific studies to determine the appropriate zone and geographical locations should be conducted by the Discharger. The use of municipal wastewater for irrigation at agronomic rates will have a comparable impact on groundwater as fresh water extracted and used for irrigation of the same crop. Beneficial reuse of wastewater conserves freshwater resources and is encouraged by the Basin Plan and agronomic application rates of wastewater cause comparable impact as widespread freshwater irrigation practices. Accordingly, benefits of groundwater monitoring in wastewater reuse areas do not justify the cost, provided the rates of wastewater applications do not exceed reasonable agronomic rates.
59. Infiltration from wastewater treatment and wastewater disposal ponds results in wastewater intersecting and accumulating on and in the uppermost layer of the uppermost groundwater until dispersed horizontally and vertically into the main mass of the aquifer. Monitoring within the aquifer should evaluate water representative of the depth of the uppermost zone that (1) has been and is expected to be perforated to extract groundwater for beneficial use and (2) would show the earliest effect from the discharge. Site-specific studies to determine the appropriate zone and geographical locations should be conducted by the Discharger subject to Executive Officer approval.
60. The Basin Plan identifies the greatest long-term problem facing the entire Tulare Lake Basin as the increase in salinity in groundwater, which has accelerated due to the intensive use of soil and water resources by irrigated agriculture. The Basin Plan recognizes that degradation is unavoidable until a valley-wide drain is constructed to carry salts out of the basin. Until the drain is available, the Basin Plan describes numerous salt management recommendations and requirements. The latter includes the requirement that discharges to land from wastewater treatment facilities not have an EC greater than source water plus 500 $\mu\text{mhos/cm}$. Accordingly, the Basin Plan allows for salinity degradation and focuses on controlling the rate of increase. The Basin Plan limits discharges to areas that recharge to good quality groundwaters to have an EC of 1,000 $\mu\text{mhos/cm}$, a chloride concentration of 175 mg/L, and boron content of 1.0 mg/L.

61. The City of Bakersfield certified final environmental impact reports (EIRs) for the WWTF expansion (May 1987) and the I-5 Site wastewater reclamation project (June 1983) in accordance with the California Environmental Quality Act (CEQA) (Public Resources Code section 21000 et seq.) and State CEQA Guidelines. The Board previously found that the two projects would not have a significant effect on water quality with mitigating conditions adopted in waste discharge and water reclamation requirements. The action to adopt waste discharge requirements for an existing facility is exempt from the provisions of CEQA in accordance with Title 14, CCR, section 15301.

Groundwater Issues

62. Groundwater beneath the WWTF Site occurs within three aquifer systems: perched, unconfined, and confined. Perched groundwater conditions frequently occur over the shallow clay layer described in Finding No. 37. Unconfined groundwater overlies the Corcoran Clay layer and is encountered at depths ranging from about 140 to 180 feet bgs, according to Discharger groundwater monitoring reports. The confined aquifer lies below the Corcoran Clay layer.
63. Groundwater monitoring data assembled by Kern County Water District indicates that depth to unconfined groundwater in the region surrounding the WWTF Site ranged from less than 50 feet bgs to greater than 300 feet bgs in Spring 1998 and that the depth to unconfined groundwater in Spring 1998 generally decreased from east to west across the region.
64. Since 1983, the Discharger has monitored unconfined groundwater in the vicinity of Section 33 (the 9-square-mile area comprised of Section 33 and surrounding Sections 29, 28, 27, 32, 34, 5, 4, and 3) as shown in Attachment E, a part of this Order. The Discharger monitors the depth and EC of perched groundwater in 12, 40-foot-deep piezometers in Section 33 and annually monitors the pH, EC, chloride, and nitrate content of unconfined groundwater in 13 privately-owned unconfined groundwater wells and one City-owned well (Monitoring Well No. 7 or MW 7).
65. The ancient Panama Slough channel that traverses the eastern half of Section 33 appears to influence the accumulation of perched groundwater beneath the WWTF Site. Depth to perched groundwater underlying the channel is usually greater than 40 feet bgs (the maximum depth of onsite piezometers). Elsewhere in Section 33, the depth to perched groundwater has also been typically greater than 40 feet bgs, although in wet years perched groundwater has risen to levels where sampling from onsite piezometers is possible. Tabulated below are Discharger data on perched groundwater EC (in $\mu\text{mhos/cm}$). Given that WWTF effluent EC is typically below 700 $\mu\text{mhos/cm}$, the high values shown below indicate the influence on underlying groundwater of the long-term discharge to the WWTF Site of highly-saline yeast plant wastewater.

<u>Piezometer</u>	<u>Aug 95</u>	<u>Jan 96</u>	<u>Dec 97</u>	<u>May 98</u>	<u>Dec 98</u>	<u>Jul 99</u>
2				3,246	1,302	1,113
4	3,140					
5			1,224	1,504		
6				1,958		

11 2,580 2,610

66. Of the 14 wells comprising the Discharger's existing unconfined groundwater monitoring well network, one is an agricultural well and the rest are domestic wells. While DWR well logs are available for three of these wells, two of the three logs are incomplete. The log for MW 7, which appears complete, indicates a perforation interval of 200 to 400 feet bgs.
67. Because the Discharger only sporadically measures groundwater depth in its unconfined groundwater monitoring wells, the Discharger's groundwater monitoring reports are not sufficiently detailed to determine the gradient and flow direction of unconfined groundwater near the boundaries of the WWTF Site. Because the treatment processes employed at the WWTF do not remove chloride to any significant extent, higher than background levels of chloride concentrations can be taken as an indication that WWTF effluent has leached into groundwater. Accordingly, based on groundwater monitoring data for chloride, it appears that the groundwater underlying the WWTF Site flows in a southwesterly direction.
68. None of the 14 wells in the Discharger's network of unconfined groundwater monitoring wells draw exclusively from the uppermost aquifer nor have any been demonstrated to meet DWR Well Standards and/or Title 27 performance standards. As such, the groundwater quality data collected since 1983 is not representative of the uppermost aquifer and inadequately characterizes the impact to upper groundwater of WWTF operations and discharges of effluent and yeast waste to the Use Area.
69. Background groundwater quality is good with respect to mineral and nitrate content. Two monitoring wells, MW 3 and MW 9 north and east of the WWTF, respectively, appear to reflect background groundwater quality. Groundwater directly under the WWTF Site is monitored in MW 7 and MW 8, north and south, respectively, of the WWTF's former aerated lagoons. Downgradient groundwater quality is reflected in MW 10 and MW 13, immediately southwest and southeast, respectively, of the southern half of Section 33. From 1983 through 1999, the average concentrations of EC, chloride and nitrate-nitrogen in groundwater extracted from these wells are tabulated below:

	EC (μ mhos/cm)	Chloride (mg/L)	Nitrate (as N) (mg/L)
Upgradient			
MW 3	266	8	0.2
MW 9	210	5	0.8
Internal			
MW 7	780	61	8.7
MW 8	694	53	1.1
Downgradient			

	EC ($\mu\text{mhos/cm}$)	Chloride (mg/L)	Nitrate (as N) (mg/L)
MW 10	712	62	1.9
MW 13	753	23	1.3

70. Discharger monitoring reports indicate that degradation of unconfined groundwater underlying the WWTF Site has decreased since the mid-1980s when the Discharger initiated offsite reclamation of WWTF effluent at the I-5 Site. Prior to 1983, the WWTF received and treated the yeast plant's wastewater and discharged treated wastewater to onsite percolation ponds and recycled a portion of the effluent flow on the Use Area. Groundwater quality underlying the WWTF appears to have improved since 1986, as indicated by monitoring data from MW 7 and MW 8. However, groundwater quality downgradient of the Use Area has degraded significantly in the period for which groundwater data is available. The concentrations of chloride and EC have increased significantly in groundwater passing through MW 10 immediately southeast of the Use Area. The measured EC is near the applicable Water Quality Objective (i.e., 700 $\mu\text{mhos/cm}$ for agricultural use) within and downgradient of the Use Area. A similar increase in groundwater chloride concentration is noted for MW 13 immediately southwest of the Use Area.
71. The long-term discharge to the Use Area of both WWTF effluent and, more significantly, of yeast waste, has increased the salinity of Use Area soils and contributed to degrade area groundwater for chloride, EC, and nitrate-nitrogen. As described in Finding Nos. 65 and 69, the Discharger has reported EC values exceeding 2,000 $\mu\text{mhos/cm}$ for perched groundwater within the Use Area and 700 $\mu\text{mhos/cm}$ for groundwater in privately-owned wells south of the Use Area (MW 10 and MW 13). The Discharger has also reported elevated chloride and nitrate in groundwater passing through internal wells (MW 7 and MW 8) and wells south of the Use Area (MW 10 and MW 13) compared to upgradient groundwater monitored in MW 3 and MW 9. Because all the monitoring wells that comprise the Discharger's existing groundwater monitoring well network extract essentially from the entire depth of the unconfined aquifer, the magnitude of the degradation of the uppermost unconfined aquifer for EC, chloride and nitrate-nitrogen, may be significantly greater than that indicated by Discharger self-monitoring data.

Degradation

72. State Water Resources Control Board (SWRCB) Resolution No. 68-16 (hereafter Resolution 68-16 or the "Antidegradation" Policy) requires the Board in regulating the discharge of waste to maintain high quality waters of the state until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in the Board's policies (e.g., quality that exceeds water quality objectives).
73. The Board finds that some degradation of groundwater beneath the WWTF and Use Area is consistent with Resolution 68-16 provided that:

- the degradation is confined to a specified area
 - the discharger minimizes the degradation by fully implementing, regularly maintaining, and optimally operating best practicable treatment and control (BPTC) measures
 - the degradation is limited to waste constituents typically encountered in municipal wastewater as specified in the groundwater limitations in this Order
 - the degradation does not result in water quality less than that prescribed in the Basin Plan.
74. Some degradation of groundwater by some of the typical waste constituents released with discharge from a municipal wastewater utility after effective source control, treatment, and control is consistent with maximum benefit to the people of California. The technology, energy, water recycling, and waste management advantages of municipal utility service far exceed any benefits derived from a community otherwise reliant on numerous concentrated individual wastewater systems, and the impact on water quality will be substantially less. Degradation of groundwater by constituents (e.g., toxic chemicals) other than those specified in the groundwater limitations in this Order, and by constituents that can be effectively removed by conventional treatment (e.g., BOD, total coliform bacteria) is prohibited. When allowed, the degree of degradation allowed depends upon many factors (i.e., background water quality, the waste constituent, the beneficial uses and most stringent water quality objective, source control measures, waste constituent treatability).

Treatment and Control Practice

75. The WWTF described in Finding No. 6 provides treatment and control of the discharge that incorporates:
- technology for secondary treatment of municipal wastewater
 - biosolids handling and treatment for reuse
 - constituent attenuation within the vadose zone
 - concrete treatment structures
 - recycling of wastewater on cropped properties
 - a pretreatment program
 - an active inflow and infiltration (I/I) rehabilitation program
 - a capital recovery fund
 - an O&M manual
 - staffing to assure proper operation and maintenance
76. The Discharger discharges sludge to unlined drying beds and effluent to unlined effluent storage ponds, allows an industrial discharge of high-salt, high-nutrient food-processing waste to the Use Area at rates in excess of agronomic uptake, has inadequate and incomplete groundwater monitoring, and, therefore, operates the WWTF and Use Area in a manner that does not constitute BPTC as used in Resolution 68-16. In addition, the existing impacts on groundwater and the appropriate level of degradation that complies with Resolution 68-16 has not been evaluated. As

described in Finding No. 4, the City is responsible for ensuring the discharge from the yeast plant to the Use Area is consistent with the California Water Code, Board plans and policies, and the terms and conditions of this Order. The yeast plant discharge does not comply with the Basin Plan's maximum EC limitation for discharges to land of 500 $\mu\text{mhos/cm}$ over source water. Further, the yeast plant waste has been applied to the Use Area at rates exceeding the agronomic uptake for nitrogen. It is appropriate for the City to ensure that the yeast plant waste is discharged at rates not exceeding agronomic uptake and that it complies with the Basin Plan's EC limitation. In so doing, it is appropriate for the City to impose time schedules for AYC to (a) comply with this Order's agronomic load requirement by reducing the amount of waste constituents AYC currently discharges to the Use Area and (b) either comply with this Order's EC limitation or cease discharge altogether to the Use Area.

77. This Order, therefore, establishes a schedule of tasks to evaluate BPTC for each treatment, storage, and disposal component of the WWTF and a schedule of tasks to characterize groundwater for all waste constituents.
78. This Order establishes interim groundwater limitations that will not unreasonably threaten present and anticipated beneficial uses or result in groundwater quality that exceeds water quality objectives set forth in the Basin Plan. This Order contains tasks for assuring that BPTC and the highest water quality consistent with the maximum benefit to the people of the State will be achieved. Accordingly, the discharge is consistent with the antidegradation provisions of Resolution 68-16. Based on the results of the scheduled tasks, the Board may reopen this Order to reconsider groundwater limitations and other requirements to comply with Resolution 68-16.
79. Pursuant to CWC section 13263(g), discharge is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge.

General Findings

80. The Board considered all the above and the supplemental information and details in the attached Information Sheet, which is incorporated by reference herein, in establishing the following conditions of discharge.
81. The Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
82. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED that Waste Discharge Requirements Order No. 88-167 is rescinded and that, pursuant to sections 13263 and 13267 of the CWC, the City of Bakersfield, its agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following at the City's Wastewater Treatment Plant No. 3 and Use Area:

[Note: Other prohibitions, conditions, definitions, and some methods of determining compliance are contained in the attached "Standard Provisions and Reporting Requirements for Waste Discharge Requirements" dated 1 March 1991.]

A. Discharge Prohibitions

1. Discharge of wastes to surface waters or surface water drainage courses is prohibited.
2. Bypass or overflow of untreated or partially-treated wastes is prohibited, except as allowed by Standard Provision E.2.
3. Discharge of waste classified as 'hazardous,' as defined in section 2521(a) of Title 23, CCR, section 2510 et seq., (hereinafter Chapter 15), or 'designated,' as defined in section 13173 of the California Water Code, is prohibited.
4. Use of untreated or partially treated waste for irrigation is prohibited.
5. Application of reclaimed water during periods of heavy rainfall, when the ground is saturated, or in a manner so as to cause runoff to and degradation of any water body or wetland, is prohibited.
6. Cross-connections between any potable water supply and piping containing recycled water are prohibited. As such, No physical connection shall exist between reclaimed water piping and any domestic water supply well that does not have an approved air gap, as defined in Title 17, California Code of Regulations (sections 7583-7585 and 7601-7605) and in DWR Well Standards (i.e., section 10 F Bulletin 74-90). All users of recycled water shall provide for appropriate backflow protection for potable water supplies as specified in Title 17, CCR, section 7604, or as specified by DHS.
7. Use of recycled water as a domestic or animal water supply is prohibited.

B. Discharge Specifications

1. The monthly average daily discharge flow shall not exceed 16.0 mgd.
2. Discharge from the WWTF shall not exceed the following limits:

<u>Constituent</u>	<u>Units</u>	<u>Monthly Average</u>	<u>Daily Maximum</u>
BOD ₅ ^{1,2}	mg/L	40	80
CBOD ₅ ^{1,3}	mg/L	35	70
Total Suspended Solids	mg/L	40	80
Chloride	mg/L	175	
Settleable Solids	mL/L	0.2	0.5

¹ The Discharger may analyze for either BOD₅ or CBOD₅ to demonstrate compliance with secondary treatment requirements.

² Five-day, 20°C biochemical oxygen demand

³ Five-day, 20°C carbonaceous biochemical oxygen demand

3. Effective **15 April 2005**, discharge from the WWTF shall not exceed the following limits:

<u>Constituent</u>	<u>Units</u>	<u>Monthly Average</u>	<u>Daily Maximum</u>
BOD ₅	mg/L	40	80
Total Suspended Solids	mg/L	40	80
Chloride	mg/L	175	
Settleable Solids	mL/L	0.2	0.5

4. The monthly average EC of the WWTF discharge shall not exceed the flow-weighted average EC of the source water plus 500 µmhos/cm. The flow-weighted average for the source water shall be a moving average for the most recent twelve months. When source water is from more than one source, the EC shall be a weighted average of all sources.
5. Effluent in the storage reservoirs and equalization lagoon shall not have a pH less than 6.5 or greater than 9.5.
6. Discharge shall be confined to the two sites described in Finding Nos. 1 and 3, or construction uses in compliance with Reclamation Specification C.10.
7. Objectionable odors originating at the WWTF Site shall not be perceivable beyond the limits of the WWTF Site.
8. As a means of discerning compliance with Discharge Specification B.7, the dissolved oxygen content in the upper zone (1 foot) of effluent in the storage reservoirs and equalization lagoon shall not be less than 1.0 mg/L.

9. Effluent in the storage reservoirs and equalization lagoon shall be managed to prevent breeding of mosquitoes. In particular:
 - a. An erosion control program should assure that small coves and irregularities are not created around the perimeter of the water surface.
 - b. Weeds shall be minimized through control of water depth, harvesting, or herbicides.
 - c. Dead algae, vegetation, and debris shall not accumulate on the water surface.
 - d. Vegetation management operations in areas in which nesting birds have been observed shall be carried out either before or after, but **not during**, the **April 1 to June 30** bird nesting season.
10. Public contact with wastewater in the treatment and storage areas shall be precluded through such means as fences and signs, or acceptable alternatives.
11. The effluent storage reservoirs and equalization lagoon shall have sufficient capacity to accommodate allowable wastewater flow, design seasonal precipitation, ancillary inflow and infiltration, and storm water collected at the WWTF. Design seasonal precipitation shall be based on total annual precipitation using a return period of 100 years, distributed monthly in accordance with historical rainfall patterns. Freeboard shall never be less than two feet (measured vertically) in the storage reservoirs and equalization lagoon.
12. The WWTF shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.
13. On or about **15 November of each year**, available effluent storage capacity shall be at least equal to the volume necessary to comply with Discharge Specification B.11.
14. No waste constituent shall be released or discharged, or placed where it will be released or discharged, in a concentration or in a mass that causes violation of Groundwater Limitations.

C. Reclamation Specifications

1. Use of reclaimed water as permitted by this Order shall comply with all the terms and conditions of the Title 22. Accordingly, use of reclaimed water shall be limited to flood irrigation of fodder, fiber, and seed crops, and of crops that undergo extensive commercial, physical, or chemical processing before human consumption (i.e., wine grapes).

2. Effective **1 January 2005**, application of WWTF effluent, combined with all other wastes discharged to the Use Area (i.e., yeast plant wastewater), shall be at reasonable agronomic rates considering the crops, soil, climate, and irrigation management system. The nutrient loading to the Use Area, including the nutritive value of organic and chemical fertilizers and of WWTF effluent and yeast plant wastewater shall not exceed the crop demand. Similarly, the hydraulic loading to the Use Area shall not exceed the crop demand.
3. As a means for implementing Reclamation Specifications C.2 and C.4, the Discharger shall ensure that AYC begins to reduce the amount of waste constituents it discharges to the Use Area by 1 January 2002 and by 1 January 2005 either ceases its discharge or discharges in a manner that complies with Reclamation Specifications C.2 and C.4. Compliance with this specification shall be determined as set forth by Provision F.5.
4. Effective **1 January 2005**, the maximum EC of all wastewater discharged to the Use Area shall not exceed the EC of source water plus 500 $\mu\text{mhos/cm}$.
5. The perimeter of the Use Area shall be graded to prevent ponding along public roads or other public areas.
6. Areas irrigated with reclaimed water shall be managed to prevent breeding of mosquitoes. More specifically:
 - a. All applied reclaimed irrigation water must infiltrate completely within a 48-hour period.
 - b. Ditches shall be maintained free of emergent, marginal, and floating vegetation (seasonal exceptions for nesting birds and wildlife habitat).
 - c. Low-pressure and unpressurized pipelines and ditches accessible to mosquitoes shall not be used to store reclaimed water.
7. The Discharger shall maintain the following setback distances from areas irrigated with reclaimed water:

<u>Setback Distance (feet)</u>	<u>To</u>
25	Property line
30	Public roads
100	Irrigation wells/Drainage courses
150	Domestic wells
8. Signs with proper wording (in English and Spanish) of a size no less than four inches high by eight inches wide shall be placed at all areas of public access and around the perimeter

of all areas used for effluent disposal or conveyance to alert the public of the use of recycled water. All signs shall display an international symbol similar to that shown in Attachment F and present the following wording:

“RECYCLED WATER—DO NOT DRINK”
“AGUA DE DESPERDICIO RECLAMADA—POR FAVOR NO TOME”

9. Reclaimed water shall be managed to minimize contact with workers.
10. If WWTF effluent is used for construction purposes, it shall comply with the most current edition of *Guidelines for Use of Reclaimed Water for Construction Purposes*. Other uses of effluent not specifically authorized herein shall be subject to revision of this Order and compliance with Title 22.

D. Sludge Specifications

Sludge in this document means the solid, semisolid, and liquid residues removed during primary, secondary, or advanced wastewater treatment processes. Solid waste refers to grit and screening material generated during preliminary treatment. Residual sludge means sludge that will not be subject to further treatment at the WWTF. Biosolids refers to sludge that has undergone sufficient treatment and testing to qualify for reuse pursuant to federal and state regulations as a soil amendment for agriculture, silviculture, horticulture, and land reclamation.

1. Sludge and solid waste shall be removed from screens, sumps, ponds, clarifiers, etc. as needed to ensure optimal plant operation.
2. Treatment and storage of sludge generated by the WWTF shall be confined to the WWTF property and conducted in a manner that precludes infiltration of waste constituents into soils in a mass or concentration that will violate Groundwater Limitations.
3. Any storage of residual sludge, solid waste, and biosolids on property of the WWTF shall be temporary and controlled and contained in a manner that minimizes leachate formation and precludes infiltration of waste constituents into soils in a mass or concentration that will violate Groundwater Limitations.
4. Residual sludge, biosolids, and solid waste shall be disposed of in a manner approved by the Executive Officer and consistent with Title 27.
5. Use of biosolids as a soil amendment shall comply with General Biosolids Order (State Water Resources Control Board Water Quality Order No. 2000-10-DWQ, *General Waste Discharge Requirements for the Discharge of Biosolids to Land for Use as a Soil Amendment in Agricultural, Silvicultural, Horticultural, and Land Reclamation Activities*). The Discharger must file a Notice of Intent for each biosolids use project to be eligible for coverage under the General Biosolids Order.

6. Use and disposal of biosolids should comply with the self-implementing federal regulations of 40 CFR 503, which are subject to enforcement by the U.S. Environmental Protection Agency (EPA), not the Board. If during the life of this Order the State accepts primacy for implementation of 40 CFR 503, the Board may also initiate enforcement where appropriate.

E. Groundwater Limitations

Release of waste constituents from any storage, treatment, or disposal component associated with the WWTF shall not cause groundwater under and beyond the WWTF and discharge area(s), as determined by an approved well monitoring network, to:

1. Contain any of the following constituents in concentration greater than as listed or greater than background quality, whichever is greater:

<u>Constituent</u>	<u>Units</u>	<u>Limitation</u>
Boron	mg/L	0.7
Chloride	mg/L	106
Iron	mg/L	0.3
Manganese	mg/L	0.05
Sodium	mg/L	69
EC	µmhos/cm	900
Total Coliform Organisms	MPN/100 mL	nondetect
Total Dissolved Solids ¹	mg/L	500
Total Nitrogen	mg/L	10
Nitrite (as N)	mg/L	1
Nitrate (as N)	mg/L	10
Ammonia (as N)	mg/L	0.5
Total Trihalomethanes	µg/L	100

¹ A cumulative impact limit that accounts for several dissolved constituents in addition to those listed here separately [e.g., alkalinity (carbonate and bicarbonate), calcium, hardness, phosphate, potassium, etc.]

2. Contain any constituent not identified in Groundwater Limitation E.1 in concentrations greater than background quality (whether chemical, physical, biological, bacteriological, radiological, or some other property or characteristic).
3. Impart taste, odor, or color that creates nuisance or impairs any beneficial use.
4. Contain concentrations of chemical constituents in amounts that adversely affect agricultural uses.

F. Provisions:

1. The Discharger shall comply with Monitoring and Reporting Program (MRP) No. 5-01-105, which is part of this Order, and any revisions thereto as ordered by the Executive Officer.
2. The Discharger shall comply with the *Standard Provisions and Reporting Requirements for Waste Discharge Requirements*, dated 1 March 1991, which are attached hereto and by reference a part of this Order. This attachment and its individual paragraphs are commonly referenced as 'Standard Provision(s).'
3. The Discharger shall implement best practicable treatment and control, including proper operation and maintenance, to comply with this Order.
4. A copy of this Order and its attachments shall be kept at the WWTF for reference by operating personnel. Key operating personnel shall be familiar with its contents.
5. **By 1 October 2001**, the Discharger shall submit a work plan and implementation schedule for reducing the amount of waste it allows American Yeast Company to discharge to the Use Area. The work plan shall detail a waste discharge reduction schedule that begins 1 January 2002 and ends no later than 1 January 2005, when AYC's discharge to the Use Area must cease entirely or comply with Reclamation Specification C.4. Following written acceptance from the Executive Officer of the work plan, this Provision will be considered satisfied. The Discharger shall implement the work plan as approved.
6. **By 1 September 2001**, the Discharger shall submit a sludge management plan that satisfies the information requirements of Attachment G *Information Needs For Sludge Management Plan*. A California registered civil engineer experienced in sludge disposal must prepare and certify the sludge management plan. Following written approval of the sludge management plan from the Executive Officer, this Provision shall be considered satisfied.
7. **By 1 November 2001**, the Discharger shall complete a hydrogeologic investigation within the area affected and potentially affected by the discharge and submit a technical report to the Executive Officer. The technical report, which shall be prepared and professionally certified by a geologist registered to practice in California, shall describe the underlying geology, existing wells (active and otherwise), local well construction practices and standards, well restrictions, and hydrogeology. The report shall recommend a representative monitoring zone of the uppermost aquifer. The recommendations shall be reviewed and approved as appropriate by the Executive Officer.
8. **Within 90 days of satisfaction of Provision 7**, the Discharger shall submit for Executive Officer approval, a technical report proposing a modified groundwater monitoring network. The technical report shall consist of a Monitoring Well Installation Workplan for a network that satisfies Attachment H, "Standard Monitoring Well Provisions for Waste Discharge

Requirements.” The network shall consist of one or more background monitoring wells and of compliance monitoring wells immediately downgradient of every treatment, storage, and disposal unit that does or may release waste constituents to groundwater. Monitoring wells used to determine compliance with this Order’s interim groundwater limitations shall be constructed to yield representative samples from the water column representative of the water depth of the uppermost zone approved by the Executive Officer pursuant to Provision 7 and shall comply with applicable Well Standards. Implementation of the Monitoring Well Installation Workplan shall be subject to the prior approval of the Executive Officer.

9. The Discharger shall comply with the following compliance schedule in conducting the groundwater monitoring well installation project:

	<u>Task</u>	<u>Compliance Date</u>
a.	Implement Monitoring Well Installation Workplan	150 days following Work Plan approval by Executive Officer
b.	Complete Monitoring Well Installation	60 days following Work Plan implementation
c.	Submit Monitoring Well Installation Report of Results	30 days following Project Completion
d.	Commence Groundwater Monitoring	30 days following Project Completion

Technical reports submitted pursuant to this Provision shall be prepared and certified by a California registered civil engineer or certified engineering geologist.

10. After satisfying Provision F.9.d, the Discharger shall continue monitoring in accordance with the groundwater monitoring program described in the MRP for **one full year** at least at the frequency specified in the MRP. **Within 90 days of completing one full year of sampling**, the Discharger shall submit a written technical report that characterizes the groundwater quality of each monitoring well. The technical report shall be prepared and certified by a California registered civil engineer or certified engineering geologist. The report shall indicate for each constituent identified in the MRP the background concentration in background well(s), and the actual concentration in each compliance monitoring well. Determinations of background quality shall be made using the methods described in Title 27, section 20415(e)(10). The report shall compare actual concentrations in each compliance monitoring well with numeric limitations and background concentrations of Groundwater Limitations E.1 and E.2 and report the compliance results. For purposes of the Report, the Discharger will recommend background limitations for waste constituents not listed in Groundwater Limitation E.1, and for those listed in E.1 where background concentrations are greater than identified. Subsequent use of a

concentration as a background limitation will be subject to the discretion of the Executive Officer.

11. **By 1 May 2002**, the Discharger shall submit for Executive Officer approval a written workplan in the form of a technical report that sets forth a schedule for a systematic and comprehensive technical evaluation of each component of the WWTF's waste treatment and control to determine, for each waste constituent, best practicable treatment and control as used in Resolution 68-16. The technical report shall contain a preliminary evaluation of each component and propose a time schedule for performing the comprehensive technical evaluation. The technical report shall be prepared and certified by a California registered civil engineer. The schedule to complete the comprehensive technical evaluation shall be as short as practicable and not exceed 14 months.
12. **By 1 July 2003**, the written comprehensive technical evaluation of each component regarding each waste constituent shall be submitted with the Discharger's written recommendations for WWTF modifications (e.g., component upgrade and retrofit). The comprehensive technical evaluation shall be prepared and certified by a California registered civil engineer. The source of funding and proposed schedule for completing modifications shall be identified. The schedule shall be as short as practicable, but in no case shall completion of all the necessary improvements exceed four years past the completion date of the comprehensive technical evaluation unless a Board specifically approves the schedule. Otherwise, the component evaluation, recommended improvements, and schedule are subject to the Executive Officers review and approval.
13. **By 1 July 2004**, the Discharger shall submit a technical report reconciling any differences between the results from work performed to satisfy Provision F.11 and the recommendations of Provision F.12, including all necessary documentation to substantiate that all treatment and control practices are defensible as BPTC. Any schedule adjustment from what was previously approved in regards to Provision F.11 shall be supported with justification. The report shall propose specific numeric groundwater limitations that reflect full implementation of BPTC for Board consideration, and describe how these were determined considering actual data from compliance monitoring wells, impact reductions through full implementation of BPTC, reasonable growth, the factors in Water Code section 13241, etc. The Discharger should consider submitting a validated groundwater model. The report shall include detailed methods the Discharger concludes will provide means to measure continuous process control and assure continuous compliance into the future.
14. Upon completion of tasks set forth in Provisions F.11 through F.13, the Board shall consider the evidence provided and may revise this Order, including revision of Groundwater Limitation E.1.

15. The Discharger shall not allow pollutant-free wastewater to be discharged into the collection, treatment, and disposal system in amounts that significantly diminish the system's capability to comply with this Order. Pollutant-free wastewater means rainfall, groundwater, cooling waters, and condensates that without treatment are essentially free of pollutants.
16. The terms and conditions of Order No. 85-244, as applied to the WWTF, are superseded by this Order.
17. The Discharger shall implement its approved pretreatment program and the program shall be an enforceable condition of this permit. If the Discharger fails to perform the pretreatment functions, the Board, the State Water Resources Control Board, or the EPA may take enforcement actions against the Discharger as authorized by the Clean Water Act.
18. The Discharger shall enforce the requirements promulgated under sections 307(b), (c), (d), and 402(b) of the Clean Water Act. The Discharger shall cause industrial users subject to federal categorical standards to achieve compliance no later than the date specified in those requirements or, in the case of a new industrial user, upon commencement of the discharge.
19. The Discharger shall perform the pretreatment functions required in 40 CFR, Part 403, including but not limited to:
 - a. Implementing the necessary legal authorities as provided in 40 CFR 403.8(f)(1);
 - b. Enforcing the pretreatment requirements under 40 CFR 403.5 and 403.6;
 - c. Implementing the programmatic functions as provided in 40 CFR 403.8(f)(2);
 - d. Providing the requisite funding and personnel to implement the pretreatment program as provided in 40 CFR 403.8(f)(3); and
 - e. Publishing a list of significant violators as required by 40 CFR 403.8(f)(2)(vii), where 'significant violators' and 'significant noncompliance' are as defined by EPA in *Pretreatment Compliance Monitoring and Enforcement Guidance* (1986).
 - f. Conducting inspections in accordance with provisions of 40 CFR 403.8(f)(1)(v) and 403.8(f)(2)(v) and ensuring compliance with pretreatment standards and requirements by (1) assessing and collecting, when appropriate, civil penalties and civil administrative penalties in accordance with Government Code sections 54740, 54740.5, and 54740.6, or (2) other equally effective means.
20. The Discharger shall report to the Board any toxic chemical release data it reports to the State Emergency Response Commission within 15 days of reporting the data to the Commission pursuant to section 313 of the "Emergency Planning and Community Right to

Know Act of 1986.” If the Board determines that the toxic waste constituent had or has a reasonable potential to cause or contribute to violation of a water quality objective, the Board may reopen this Order and prescribe an effluent limitation for the constituent.

21. In the event of any change in control or ownership of waste treatment facilities or use area described herein, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to this office. To assume operation under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the requesting entity's full legal name, the state of incorporation if a corporation, the name and address and telephone number of the persons responsible for contact with the Board, and a statement. The statement shall comply with the signatory paragraph of Standard Provision B.3 and state that the proposed owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code. Transfer shall be approved or disapproved by the Executive Officer.
22. The Discharger shall comply with all conditions of this Order, including timely submittal of technical and monitoring reports as directed by the Executive Officer. Violations may result in enforcement action, including Board or court orders requiring corrective action or imposing civil monetary liability, or in revision or rescission of this Order.
23. The Board will review this Order periodically and will revise requirements when necessary.

I, GARY M CARLTON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 27 April 2001.

Ordered by: _____ Original signed by _____
GARY M. CARLTON, Executive Officer

Order Attachments:

Monitoring and Reporting Program

A. Vicinity Map

B. WWTF Layout

C. WWTF Flow Diagram

D. I-5 Reclamation Site Vicinity Map

E. Unconfined Groundwater Monitoring Wells

F. Recycled Water Sign Symbol

G. Information Needs for Sludge Management Plan

H. Standard Monitoring Well Provisions for Waste Discharge Requirements

Information Sheet

Standard Provisions (1 March 1991 version) (separate attachment to Discharger only)

DSS/jlk:4/27/01 AMENDED

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. 5-01-105
FOR
CITY OF BAKERSFIELD
WASTEWATER TREATMENT PLANT NO. 3
KERN COUNTY

Specific sample station locations shall be established with concurrence of the Board's staff. The Discharger shall submit a description of the stations (including creek monitoring locations) to the Board and attach to its own copy of this Order a copy of the sample station descriptions. Board staff will ask to see and refer to the descriptions while conducting onsite compliance inspections.

INFLUENT MONITORING

Influent samples shall be collected at the inlet of the headworks and at approximately the same time as effluent samples. Influent monitoring shall include at least the following:

<u>Constituents</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Sampling Frequency</u>
Total Daily Flow	mgd	Metered	Continuous ¹
Monthly Average of Total Daily Flow	mgd	Computed	Monthly
Settleable Solids	ml/L	Grab	Daily ²
pH	pH units	Grab	Weekly
BOD ₅ ²	mg/L	24-hr Composite ³	2/Week ⁴
<u>Total Suspended Solids</u>	mg/L	24-hr Composite ³	2/Week ⁴

¹ Monitored daily

² Monday through Friday

³ Composite samples may consist of flow-proportioned grab samples.

⁴ On nonconsecutive days

EFFLUENT MONITORING

Except for flow, which may be measured either at the headworks or outlet from the treatment system, effluent samples shall be collected just prior to discharge to the storage reservoirs, equalization lagoon, or reclamation land. Effluent samples shall be representative of the volume and nature of the discharge. Time of collection of grab and composite samples shall be recorded. Effluent monitoring shall include at least the following

<u>Constituents</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Sampling Frequency</u>
Total Daily Flow	mgd	Metered	Continuous
EC ¹	µmhos/cm	Composite	Weekly
Settleable Solids	ml/L	Grab	Daily ²
pH	pH units	Grab	Daily
BOD ₅	mg/L	24-hr Composite ²	Weekly ³
CBOD ₅	mg/L	24-hr Composite ²	Weekly ³
Total Suspended Solids	mg/L	24-hr Composite ²	Weekly ³
Total Dissolved Solids ⁴	mg/L	24-hr Composite ²	Weekly ³
Nitrate (as N)	mg/L	24-hr Composite ²	Monthly ⁵
Total Kjeldahl Nitrogen	mg/L	24-hr Composite ²	Monthly ⁵
Ammonia (as N)	mg/L	24-hr Composite ²	Monthly ⁵
Total Nitrogen	mg/L	Calculated	Monthly ⁵
Metals ⁶	µg/L	24-hr Composite ²	Quarterly ^{7,8}
<u>General Minerals⁹</u>	mg/L	24-hr Composite ²	Quarterly ⁸

¹ Conductivity at 25EC

² Monday through Friday

³ On nonconsecutive days

⁴ The total dissolved solids (TDS) and inorganic (or fixed) fraction of TDS referred to in this program shall be determined using EPA Test Method Nos. 160.1 and 160.4, respectively.

⁵ Concurrent with BOD₅ sampling

⁶ Metals analysis referred to in this program shall include arsenic, barium, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, silver, and zinc.

⁷ Metals analysis may be submitted as part of the Quarterly Pretreatment Report.

⁸ January, April, July, and October

⁹ General minerals referred to in this program shall include constituents identified in the General Minerals Analyte List below.

General Minerals Analyte List

Alkalinity (as CaCO ₃)	Chloride	Phosphate
Bicarbonate (as CaCO ₃)	Hardness (as CaCO ₃)	Postassium
Boron	Iron	Sodium
Calcium	Magnesium	Sulfate
<u>Carbonate (as CaCO₃)</u>	Manganese	

Sample Collection and Preservation: Using proper sampling methods and appropriate sample containers is critical in obtaining valid results for general minerals analyses. Please follow laboratory directions and secure sample containers as appropriate for requesting analyses for general minerals (including total dissolved metals).

Any sample placed in an acid-preserved bottle must first be filtered or you risk the chance of increasing the concentration of metals to nonrepresentative values and making cation/anion balance impossible. If field filtering is not feasible, collect samples in unpreserved containers and submit to the laboratory within 24-hours with a request (on the chain-of-custody form) to immediately filter then preserve the sample.

Sample Analysis: Inform the laboratory that you are interested in “total dissolved metals” and write this on your

chain-of-custody form in the same box as “General Minerals.” This step should help insure that the laboratory filters samples before they are preserved. You must request these analyses separately on your chain-of-custody form.

STORED EFFLUENT MONITORING

The storage reservoirs and equalization lagoon shall be monitored as follows:

<u>Constituent</u>	<u>Unit</u>	<u>Type of Sample</u>	<u>Frequency</u>
pH	pH units	Grab	Weekly
Freeboard	feet	Observation	Weekly
Dissolved Oxygen	mg/L	Grab ¹	Weekly ²

¹ Samples shall be collected at a depth of one foot, opposite the inlet. Dissolved oxygen samples shall be collected between 0800 and 0900 hours.

² If results indicate a concentration of less than 1.0 mg/L or if offensive odors are noted in violation of Discharge Specification B.7 and B.8, the frequency of monitoring shall be increased as necessary to characterize the period of noncompliance.

Permanent markers shall be placed in the storage reservoirs and equalization lagoon with calibrations indicating the water level at design capacity and available operational freeboard. In addition, the Discharger shall inspect the condition of the storage reservoirs and equalization lagoon once per week. If a condition is observed, where the operation and maintenance (O&M) manual indicates remedial action is necessary, the Discharger shall briefly explain in the transmittal what action was observed and what action has been taken or is scheduled to be taken. The Discharger shall certify whether or not it is in compliance with Discharge Specification B.13 in each November monitoring report.

USE AREA MONITORING

The type of crop(s) irrigated, amounts of water, recycled water, and/or yeast plant wastewater, applied to the crops(s) (in million gallons and in acre-feet) and amounts of total dissolved solids, chemical fertilizers and soil amendments, if any (in pounds per acre), shall be measured and reported to the Board quarterly in accordance with the following schedule:

<u>Monitoring Period</u>	<u>Reports Due</u>
January - March	1 May
April - June	1 August
July - September	1 November
October - December	1 February

Each quarterly report shall indicate the cumulative loading of salt (as TDS in lb/ac) applied to the Use Area during the previous calendar year. Values shall be reported along with supporting calculations.

PERCHED GROUNDWATER MONITORING

Concurrently with the sampling described below, the Discharger shall measure the water depth in each piezometer and report the measurement as depth to groundwater (in feet and hundredths) and as groundwater surface elevation (in feet and hundredths above mean sea level).

Samples shall be collected from the existing piezometer network and analyzed for the following:

<u>Constituent/Parameter</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Frequency</u>
Perched Groundwater Depth	feet bgs ¹	Grab	Quarterly ²
Perched Groundwater Elevation	feet amsl ³	Grab	Quarterly ²
TDS	mg/L	Grab	Quarterly ²
EC	µmhos/cm	Grab	Quarterly ²
Nitrate (as N)	mg/L	Grab	Quarterly ²
Total Kjeldahl Nitrogen	mg/L	Grab	Quarterly ²
Ammonia (as N)	mg/L	Grab	Quarterly ²
Total Nitrogen	mg/L	Calculated	Quarterly ²
Sodium	mg/L	Grab	Quarterly ²
Chloride	mg/L	Grab	Quarterly ²
Iron ⁴	mg/L	Grab	Quarterly ²
Manganese ⁴	mg/L	Grab	Quarterly ²

¹ below ground surface

² January, April, July and October

³ above mean sea level

⁴ Samples shall pass through a 0.45 µm filter prior to sample preservation.

UNCONFINED GROUNDWATER MONITORING

Prior to collecting samples, the monitoring well shall be adequately purged to remove water that has been standing within the well screen and casing that may not be chemically representative of formation water. Depending on the hydraulic conductivity of the geologic setting, the volume removed during purging is typically from 3 to 5 volumes of the standing water within the well casing and screen, or additionally the filter pack pore volume.

At least quarterly and concurrently with groundwater quality sampling, the Discharger shall measure the water level in each well and report water level data as groundwater depth (in feet and hundredths) and as groundwater surface elevation (in feet and hundredths above mean sea level). The horizontal geodetic location for each monitoring well shall be provided where the point of beginning shall be described by the California State Plane Coordinate System, 1983 datum.

Samples shall be collected from the approved monitoring wells and analyzed for the following constituents at the following frequency:

<u>Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Frequency</u>
pH	pH Units	Grab	Quarterly ¹
Total Coliform Organisms	MPN/100 ml	Grab	Quarterly ¹
TDS	mg/L	Grab	Quarterly ¹
EC	µmhos/cm	Grab	Quarterly ¹
Nitrate (as N)	mg/L	Grab	Quarterly ¹
Total Kjeldahl Nitrogen	mg/L	Grab	Quarterly ¹
Ammonia (as N)	mg/L	Grab	Quarterly ¹
Total Nitrogen	mg/L	Calculated	Quarterly ¹
Total Organic Carbon	mg/L	Grab	Quarterly ¹
General Minerals	mg/L	Grab	Quarterly ¹
Metals	mg/L	Grab	Quarterly ¹

¹ January, April, July and October

In reporting the results of the sampling events, the Discharger shall include a detailed description of the procedures and techniques for: (a) sample collection, including purging techniques, sampling equipment, and decontamination of sampling equipment; (b) sample preservation and shipment; (c) analytical procedures; and (d) chain of custody control.

After one full year of groundwater monitoring, the Discharger shall analyze monitoring data from background well(s) to compute background water quality values for each monitored constituent and to perform an initial assessment of whether there is evidence of an impact from the discharge. To complete this task, the Discharger shall use monitoring data from background and boundary wells in an appropriate data analysis method as described in Title 27, section 20415(e)(7-9) (hereafter Data Analysis

Method). Reports thereafter shall be submitted quarterly by the **1st day of the second month** after the prescribed sample collection and shall include the same analysis. The Discharger shall perform the Data Analysis Method on the following constituents:

Groundwater Constituents to Evaluate Using Data Analysis Method

Alkalinity (as CaCO ₃)	Nitrate (as N)
Ammonia (as N)	Phosphate
Boron	Potassium
Calcium	Sodium
Chloride	Sulfate
Hardness (as CaCO ₃)	TDS
Iron	TKN
Magnesium	Total Nitrogen
Manganese	TOC

If the Discharger during any quarterly data evaluation finds statistically significant evidence of an increase in groundwater at boundary wells compared to background levels of any constituent listed above, the Discharger shall conclude that the WWTF operation or discharge has caused the increase unless it can demonstrate an offsite source. The Discharger shall describe the data analysis method used as well as the criteria it used for determining 'statistically significant evidence,' and submit within two weeks, at confirmation, a written report pursuant to Standard Provision B.1.

SLUDGE (BIOSOLIDS) MONITORING AND REPORTING

To ensure that discharges to the WWTF are not interfering with the treatment process, the Discharger shall collect a composite sample of sludge when it is removed from the aerated lagoons and/or the four disposal ponds. Samples shall be collected in accordance with EPA's *POTW SLUDGE SAMPLING AND ANALYSIS GUIDANCE DOCUMENT, AUGUST 1989*, and tested for the following metals:

Arsenic	Copper	Nickel
Cadmium	Lead	Selenium
Molybdenum	Mercury	Zinc

Biosolids monitoring, record keeping, characterization, storage, and disposal shall be in accordance with 40 CFR 503 and Title 22 as described in *City of Bakersfield Wastewater Treatment Plant 3, Final Biosolids Management Plan*, (September 1997). Biosolids shall be sampled prior to removing stockpiled biosolids from the WWTF, samples submitted for analysis shall be a representative composite of a minimum of four (4) discrete samples. Sampling records shall be retained for a minimum of five years. A log shall be kept of biosolids quantities generated and of handling and disposal activities. The frequency of entries is discretionary; however, the log should be complete enough to serve as a basis for part of the biosolids monitoring report described below.

WATER SUPPLY MONITORING

A sampling station shall be established where a representative sample of the City's water supply can be obtained. Water supply monitoring shall include at least the following:

<u>Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Frequency</u>
EC	µmhos/cm	Grab	Quarterly ¹
<u>TDS</u>	mg/L	Grab	Once every 3 years ²

¹ January, April, July and October

² Coincident with monitoring required by the California Department of Health Services

If the source water is from more than one source, the results shall be reported as a flow weighted average and include copies of supporting calculations.

PRETREATMENT MONITORING AND REPORTING

The Discharger shall submit annually a report to the Regional Board, with copies to EPA Region 9 and the State Board, describing the Discharger's pretreatment activities over the previous 12 months. In the event that the Discharger is not in compliance with any conditions or requirements of this Order, including noncompliance with pretreatment audit/compliance inspection requirements, the Discharger shall also include reasons for noncompliance and state how and when the Discharger shall comply with such conditions and requirements. The annual pretreatment report is due by **28 February of each year**.

In addition to the information required in the annual pretreatment report, the Discharger shall submit a quarterly report **by the 1st day of the second month following the end of each calendar quarter**. The report shall contain, but not be limited to, the items in Standard Provision E.7.

If none of the items in Standard Provision E.7 exists, at a minimum a letter indicating that all industries are in compliance and no violations or changes to the pretreatment program have occurred during the quarter must be submitted. The information required in the fourth quarter report shall be included as part of the annual report.

Signed copies of the reports shall also be submitted to the EPA Regional Administrator and the State Board at the following addresses, or as advised in writing subsequent to adoption of this Order:

Regional Administrator
U.S. Environmental Protection Agency, Region 9
Water Management Division (W-5-2)
75 Hawthorne Street
San Francisco, CA 94105

Pretreatment Program Manager
Division of Water Quality
State Water Resources Control Board
P.O. Box 944213
Sacramento, CA 94244-2130

REPORTING

Daily, weekly, twice weekly, monthly, and quarterly monitoring data shall be reported in monthly monitoring reports submitted to the Board by the **1st day of the second month following sample collection**. All reports submitted in response to this Order shall comply with the signatory requirements in Standard Provision B.3.

In reporting the monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner that illustrates clearly whether the Discharger complies with waste discharge requirements, including calculation of all averages, etc. If violations of waste discharge requirements have occurred, the report shall discuss the corrective actions taken and planned to bring the discharge into full compliance with the waste discharge requirements.

If the Discharger monitors any waste constituent at the locations designated herein more frequently than is required by this Order, the results of such monitoring shall be included in the discharge monitoring report.

The Discharger may also be requested to submit an annual report to the Board with tabular and graphical summaries of the monitoring data obtained during the previous year. Any such request shall be made in writing.

By **1 February of each year**, the Discharger shall submit a written Annual Report to the Executive Officer containing the following:

- a. The names, titles, certificate grade, and general responsibilities of persons operating and maintaining the wastewater treatment facility.
- b. The names and telephone numbers of persons to contact regarding the plant for emergency and routine situations.
- c. A certified statement of when the flow meter and other monitoring instruments and devices were last calibrated, including identification of who did the calibration (Standard Provision C.4).
- d. A statement whether the current O&M manual and contingency plan reflect the wastewater treatment plant as currently constructed and operated, and the dates when these documents were last reviewed for adequacy.
- e. The results of an annual evaluation conducted pursuant to Standard Provision E.4 and a figure depicting monthly average daily discharge flow for the past five years.
- f. The latest City of Bakersfield Annual Source Water Quality Report and a tabular summary of source water monitoring results.

- g. A summary of reclamation operations
- h. A summary of yeast plant discharge operations (when applicable)
- i. A summary of biosolids monitoring and disposal, including
 - (1) For **landfill disposal**, include: (a) the Order numbers of WDRs that regulate the landfill(s) used, (b) the present classification of the landfill(s) used, (c) the names and locations of the facilities receiving sludge, and (d) the biosolids quantity disposed (specify wet or dry weight).
 - (2) For **land application**, include: (a) the location of the site(s) including specific application areas within large sites, and (b) the Order numbers of any WDRs or WRRs that regulate the site(s).
 - (3) For **composting**, include: (a) the location of the site(s), (b) the Order numbers of any WDRs that regulate the site(s), and the quantity of biosolids composted (dry weight).
- j. A summary of perched groundwater monitoring, including
 - (1) All monitoring analytical data obtained during the previous four quarterly reporting periods, presented in tabular form, as well as on 3.5-inch computer diskettes (or submitted separately via e-mail), either in MS-DOS / ASCII format or in another file format acceptable to the Executive Officer (e.g., Microsoft Excel); and
 - (2) A comprehensive discussion of the compliance record, and the result of any corrective actions taken or planned that may be needed to bring the Discharger into full compliance with the waste discharge requirements.
- k. A summary of groundwater monitoring, including
 - (1) Hydrographs showing the groundwater elevation in each approved well for at least the previous five years (as data become available). The hydrographs should show groundwater elevation with respect to the elevations of the top and bottom of the screened interval and be presented at a scale of values appropriate to show trends or variations in groundwater elevation. The scale for the background plots shall be the same as that used to plot downgradient elevation data;
 - (2) Graphs of the laboratory analytical data for all samples taken from each approved well within at least the previous five calendar years (as data become available). Each such graph shall plot the concentration of one or more evaluated constituents (as listed in the above table) over time for a given monitoring well, at a scale appropriate to show trends or variations in

water quality. The graphs shall plot each datum, rather than plotting mean values. For any given constituent, the scale for the background plots shall be the same as that used to plot downgradient data. Separate graphs shall show hydrologic equipotential gradients and equal concentration gradients for evaluated constituents;

- (3) All monitoring analytical data obtained during the previous four quarterly reporting periods, presented in tabular form, as well as on 3.5-inch computer diskettes (or submitted separately via e-mail), either in MS-DOS / ASCII format or in another file format acceptable to the Executive Officer (e.g., Microsoft Excel); and
- (4) A comprehensive discussion of the compliance record, and the result of any corrective actions taken or planned that may be needed to bring the Discharger into full compliance with the waste discharge requirements.

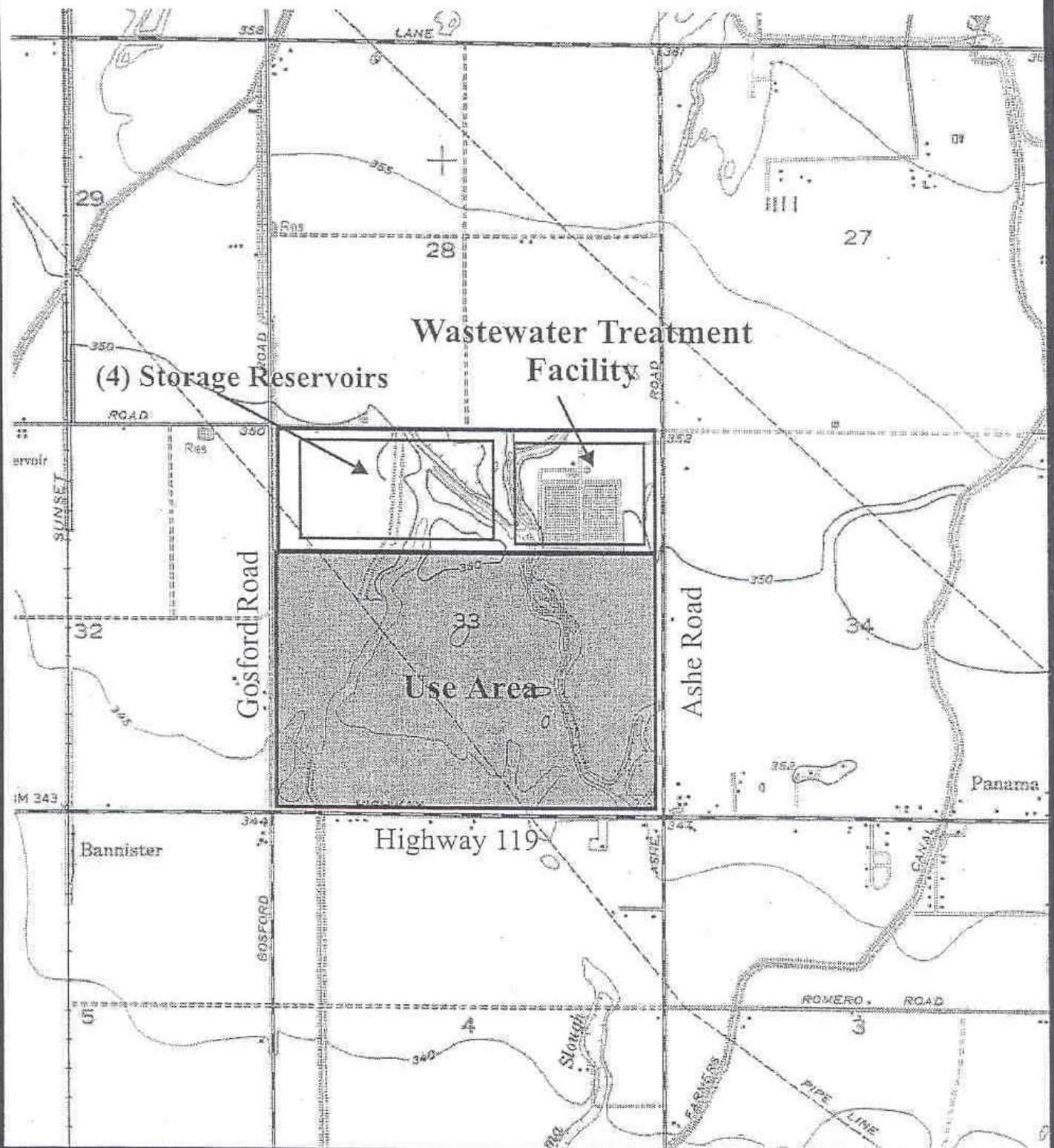
The Annual report shall discuss the compliance record for the reporting period. If violations have occurred, the report shall also discuss the corrective actions taken and planned to bring the discharge into full compliance with this Order. All reports submitted in response to this Order shall comply with the signatory requirements in Standard Provisions B.3. Reports submitted concerning facility performance must also be signed and certified by the chief plant operator. When reports contain laboratory analyses performed by the Discharger and the chief plant operator is not in the direct line of supervision of the laboratory, reports must also be signed and certified by the chief of the laboratory.

The Discharger shall implement the above monitoring program on the first day of the month following adoption of this Order.

Ordered by: Original signed by
GARY M. CARLTON, Executive Officer

27 April 2001
(Date)

DSS/jlk:4/27/01 AMENDED



Not to scale

ATTACHMENT A
WASTE DISCHARGE REQUIREMENTS
ORDER NO. 5-01-105
CITY OF BAKERSFIELD
WASTEWATER TREATMENT PLANT NO. 3
KERN COUNTY
VICINITY MAP
Section 33, T30S, R27E, MDB&M
Gosford, CA 7.5 Min. Quad Map

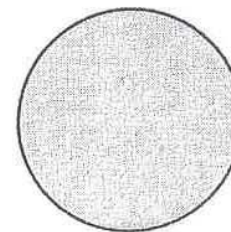
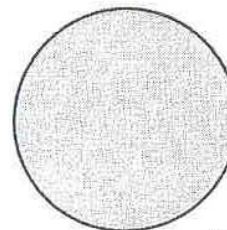
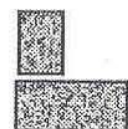
(4) STORAGE RESERVOIRS TO THE WEST
← NOT SHOWN

HEADWORKS &
AERATED GRIT CHAMBERS

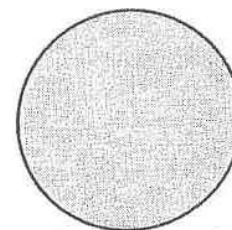
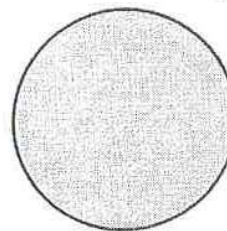
ODOR CONTROL
BUILDING

MAINTENANCE
BUILDING

OPERATIONS
BUILDING



Trickling Filter Pump Station

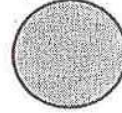
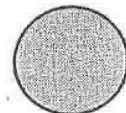
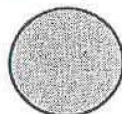
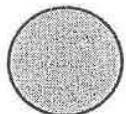


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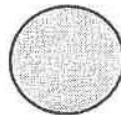
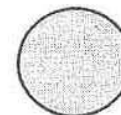
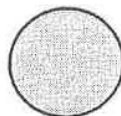
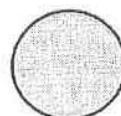


COGENERATION
BUILDING

(4) PRIMARY
CLARIFIERS



(4) SECONDARY
CLARIFIERS



SLUDGE BEDS

SLUDGE BEDS

EQUALIZATION LAGOON



**ATTACHMENT B
WWTF LAYOUT**

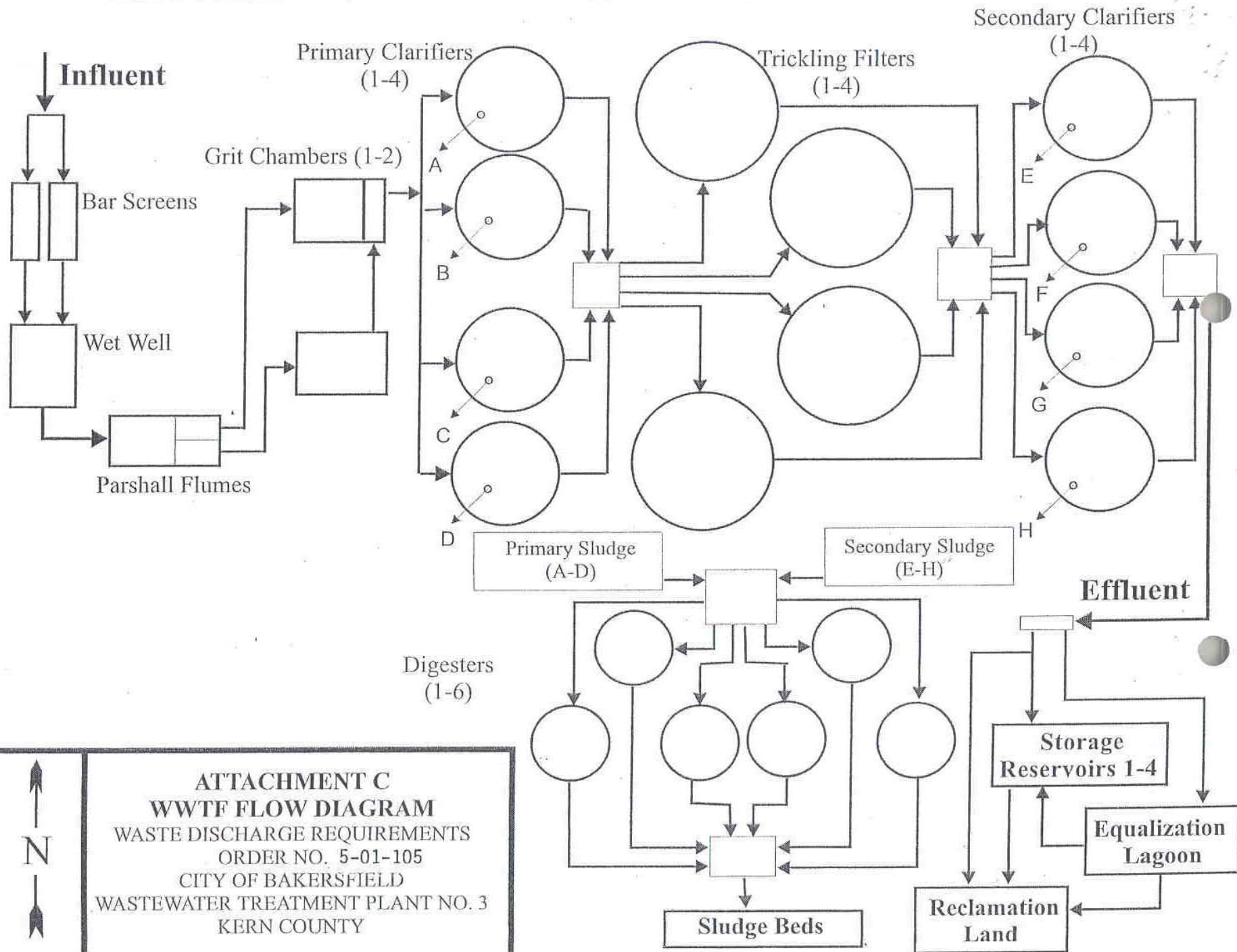
WASTE DISCHARGE REQUIREMENTS

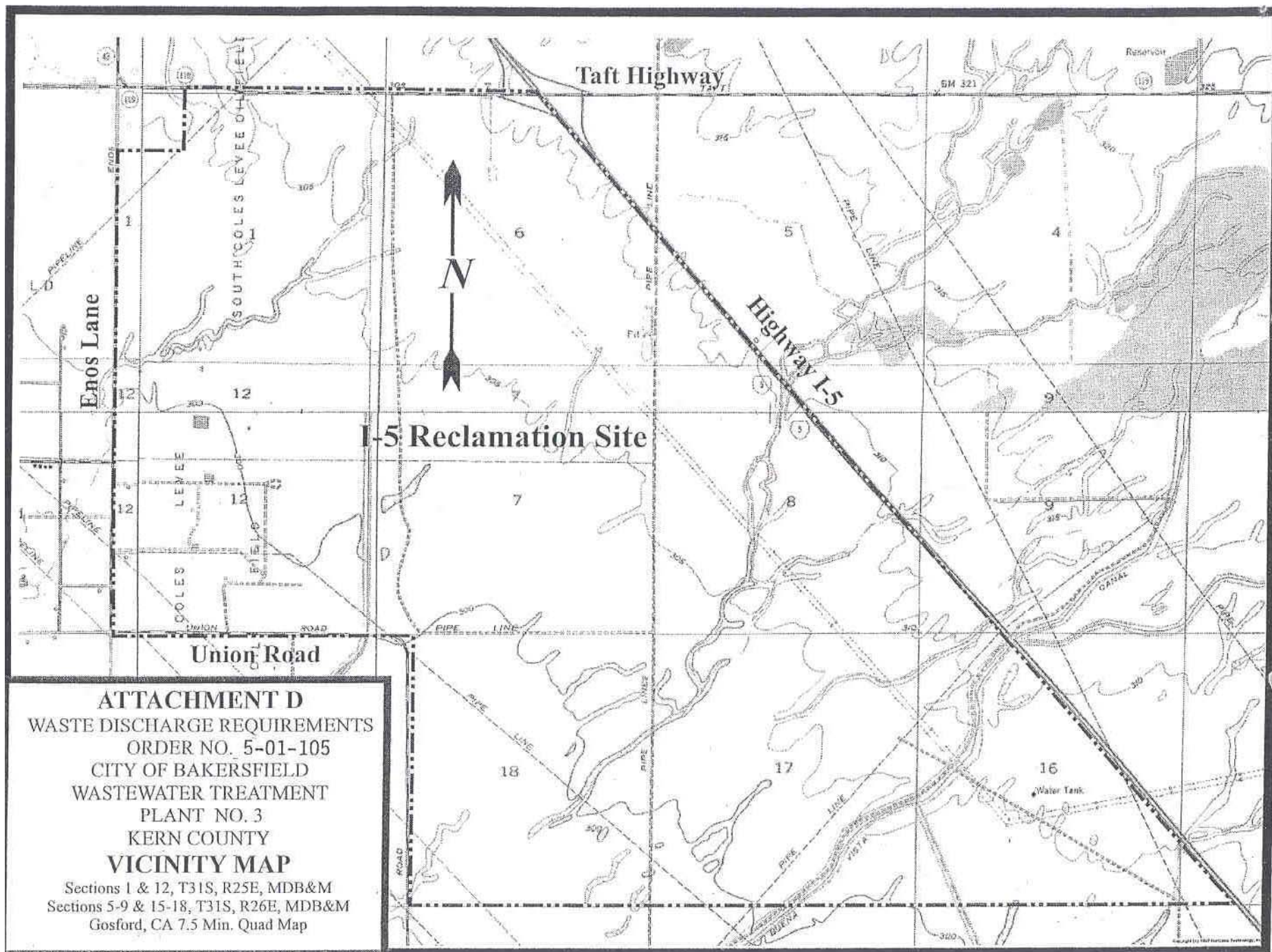
ORDER NO. 5-01-105

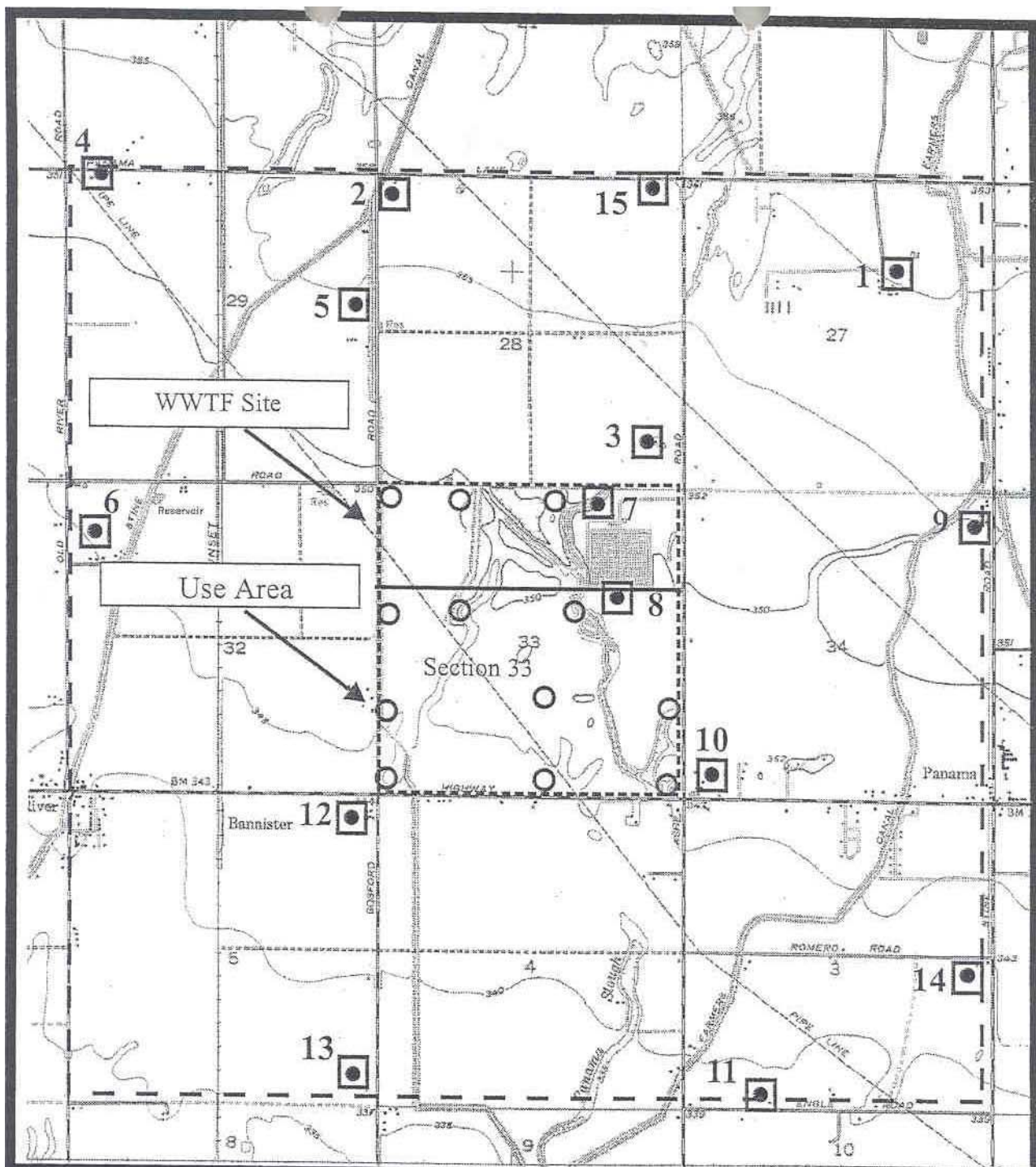
CITY OF BAKERSFIELD

WASTEWATER TREATMENT PLANT NO. 3


KERN COUNTY








Not to scale

 Unconfined Groundwater Monitoring Well

 Shallow Groundwater Monitoring Piezometer

ATTACHMENT E
WASTE DISCHARGE REQUIREMENTS
ORDER NO. 5-01-105
CITY OF BAKERSFIELD
WASTEWATER TREATMENT PLANT NO. 3
KERN COUNTY
UNCONFINED GROUNDWATER
MONITORING WELLS
 Section 33, T30S, R27E, MDB&M
 Gosford, CA 7.5 Min. Quad Map



ATTACHMENT F
WASTE DISCHARGE REQUIREMENTS ORDER NO. '5-01-105
CITY OF BAKERSFIELD
WASTEWATER TREATMENT PLANT NO. 3
KERN COUNTY

INFORMATION SHEET

ORDER NO. 5-01-105
CITY OF BAKERSFIELD
WASTEWATER TREATMENT PLANT NO. 3
KERN COUNTY

The City of Bakersfield (hereafter Discharger or City) owns and operates a wastewater treatment facility (WWTF) that it identifies as Wastewater Treatment Plant No. 3 and is hereafter referred to as WWTF. The WWTF has an approved pretreatment program that regulates eight Significant Industrial Users. A WWTF expansion project was completed in April 1999. The expanded WWTF has a 16.0 million gallon per day (mgd) design flow (formerly 12.0 mgd) and includes two inlet screens, a wet well, two Parshall flumes, two aerated grit chambers, four primary clarifiers, four trickling filters, four secondary clarifiers, six anaerobic sludge (biosolids) digesters, four effluent storage reservoirs, 20 acres of biosolids drying beds, and an effluent equalization lagoon (Attachment A). The WWTF also has a cogeneration plant that converts methane from the anaerobic digesters into electrical energy and an odor control facility that treats foul air pulled from the headworks, grit chambers, and covered primary clarifiers.

PRETREATMENT

The United States Environmental Protection Agency (EPA) approved the City's pretreatment program on 15 October 1985 and granted the State and regional water boards approval authority to administer the Pretreatment Regulations on 25 September 1989. The City adopted a revised sewer code with local limits on 30 August 1995 (effective on 15 November 1995) and the Board adopted *Resolution No. 96-041 Approving the Program Modification for Revised Legal Authority for the City of Bakersfield Pretreatment Program* on 23 February 1996. The Discharger's 1998 Annual Pretreatment Report (Report) indicates that two significant industrial users discharge waste into the WWTF collection system. The City employs three full-time industrial waste inspectors for the combined WWTF and Wastewater Treatment Plant No. 2 service areas.

BIOSOLIDS MANAGEMENT

The Discharger submitted a Biosolids Management Plan (BMP), dated 26 September 1997, which indicates that sludge (biosolids) from the WWTF and from the City's Wastewater Treatment Plant No. 2 are applied on the 5,100-acre Garone Farms reclamation site at rates within agronomic crop demands. Garone Farms leases the land from the City and is permitted under WRR Order No. 82-049. The BMP describes the City's biosolids testing program and the quality of stockpiled biosolids tested in 1993. The BMP indicates that the City samples biosolids in accordance with California Code of Regulations, Title 22, for toxicity, corrosivity, reactivity, and ignitability. According to the BMP, the WWTF biosolids comply with Title 22 Total Threshold Limit Concentrations (TTLC) and Soluble Threshold Limit Concentrations (STLC) and EPA's 'High Quality' criteria for metals. The BMP indicates that the biosolids meet EPA Class B Pathogen Reduction and Vector Attraction Reduction Requirements. According to the BMP, the biosolids monitoring frequency is based on the amount of biosolids moved offsite (applied to land) in accordance with Title 40, Code of Federal Regulations (40 CFR), Part 503.

RECLAMATION OPERATIONS

The Discharger reclaims effluent on 400 acres of City-owned land (hereafter referred to as Use Area) immediately south of the WWTF and on a 4,700-acre reclamation site (hereafter referred to as the I-5 Site) about eight miles to the southwest of the WWTF alongside Interstate 5. The I-5 Site has a disposal capacity of 20 mgd, according to the City's 1984 environmental impact report, and is regulated by WRRs Order No. 88-172 and Special Order No. 94-366. The WWTF and Use Area (hereafter referred to collectively as 'WWTF Site' or 'Section 33') comprise all land in Section 33, T30S, R26E, MDB&M. A maximum of 730 million gallons, 2 mgd, of treated municipal wastewater is recycled annually on the 400-acre Use Area to irrigate Bermuda grass. That which is not reused on the Use Area is recycled on the I-5 Site.

Since 1983, the Use Area has received industrial wastewater from a yeast plant formerly owned by the Busch Industrial Products Corporation and currently owned by the American Yeast Company (AYC). The AYC employs about 30 people in its yeast production plant. The wastewater results from the aerobic fermentation of cane and beet molasses feedstock. Two separate waste streams generated from the operation are identified as (1) 'process wastewater' (or as 'liquid nutrient'), and as (2) 'first pass spent beer' (or as 'soil amendment'). The discharge of this industrial wastewater to the Use Area is regulated by WDRs Order No. 83-016 and Wastewater Reclamation Requirements (WRR) Order No. 83-017. Order No. 83-016 allows a 30-day average daily discharge of up to 0.65 mgd of yeast plant wastewater to the Use Area (referred to in Order Nos. 83-016 and 83-017 as the 'Bakersfield yeast plant land application site').

AYC self-monitoring reports indicate that the daily BOD₅ loading from the AYC and WWTF discharges during 2000 averaged approximately 65.4 lb/ac/d and 0.8 lb/ac/d, respectively. The Use Area's annual nitrogen loadings from AYC and WWTF discharges were approximately 2,023 lb/ac/yr and 195 lb/ac/yr, respectively (a combined annual total loading of 2,218 lb/ac).

In a May 2000 meeting with Board staff, AYC indicated that the actual nitrogen and salt loadings should be much less than its submitted estimates because the estimated loadings were based on samples taken following a waste intensive process (first rinse of molasses) and do not represent the entire discharge (i.e., the flow-weighted daily average values should be much lower). AYC conducted an investigation to determine whether its current grab sampling protocol generates data that is representative of its discharge to the Use Area. In this investigation, AYC collected composite samples of its wastewater from its 600,000-gallon storage tank on eight 7-day periods between February and October 2000 (April omitted). The composite samples consisted of hourly samples collected over a 24-hour period for seven consecutive days (24-hr/7-day). Concurrent with this sampling, AYC also obtained weekly grab samples at the Use Area for comparison. During the months of composite and weekly grab sampling events, AYC's monthly average wastewater flow ranged from 0.419 to 0.472 mgd and averaged 0.445 mgd. The results of AYC's recent investigation are as follows:

<u>Constituent</u>	<u>Units</u>	<u>Average Grab</u>	<u>Average Composite</u>	<u>Composite Maximum</u>
Total Nitrogen	mg/L	600	460	1,010
Total Suspended Solids	mg/L	1,360	1,900	3,200
BOD ₅	mg/L	7,040	6,590	10,350
Chemical Oxygen Demand	mg/L	18,950	17,670	27,230

From the data above, it appears that AYC's grab sampling protocol characterizes the discharge as having greater concentrations of nitrogen, BOD₅, and COD compared to data obtained from composite sampling. Using an annual average discharge flow of 0.444 mgd and the values above to estimate mass loading of waste constituents to the Use Area yields the following:

<u>Constituent</u>	<u>Units</u>	<u>Grab</u>	<u>Composite</u>
Total Nitrogen	lb/ac/yr	2,030	1,550
Total Suspended Solids	lb/ac/d	13	18
BOD ₅	lb/ac/d	65	61
Chemical Oxygen Demand	lb/ac/d	175	164

Assuming AYC's recent investigation has resulted in a representative characterization of its discharge to the Use Area, the nitrogen loading from AYC's discharge to the Use Area appears to be about 1,550 lb/ac/yr. This loading is equivalent to an effluent nitrogen concentration of about 460 mg/L. Additional nitrogen loading from the reuse of WWTF effluent on the Use Area adds another 195 lb/ac, making the total nitrogen loading to the Use Area about 1,745 lb/ac/yr.

The AYC recently collected data on EC and daily flows for five of its eight individual waste streams, but did not monitor EC during its weekly grab and 24-hr/7-day sampling described above. These five waste streams, when combined, account for about 0.252 mgd of AYC's current total average daily discharge of 0.442 mgd. A flow-weighted average of the EC of these five waste streams is about 10,500 µmhos/cm. While the EC of all eight waste streams combined is uncertain, the remaining three waste streams reportedly do not contribute significant quantities of TDS. Based on this information and assuming multiplying EC by 0.6 approximates fixed or inert TDS, AYC's discharge to the Use Area results in a minimum salt loading of about 12,000 lb/ac/yr. Additional fixed TDS loading from WWTF effluent currently recycled on the Use Area is about 5,700 lb/ac/yr (given an annual recycle flow of 730 million gallons, an effluent EC of about 625 µmhos/cm, and assuming fixed TDS = 0.6EC). Therefore, the total fixed TDS loading to the Use Area from AYC's discharge and WWTF effluent is about 17,700 lb/ac/yr. The salt loading (as inorganic TDS) was measured for the month of December 2000, and totaled 560,930 lbs. This equates to an average annual loading of 17,084 lbs/acre.

By letter dated 2 February 2001, AYC proposed a process involving an evaluation of two alternative methods of decreasing their high strength discharge to the Use Area. One proposal AYC is considering

explores the use of anaerobic digestion followed by reverse osmosis and crystallization to reduce the BOD, nitrogen, and mineral content of their waste prior to discharge to the Use Area. An alternative proposal involves separating and concentrating high strength waste streams that might then be used as cattle feed supplement. AYC's schedule through construction and startup are shown in the table below.

<u>TASK</u>	<u>DATE</u>	<u>DURATION</u>
Feasibility Study	Feb. - Aug., 2001	7 Months
Construction of Preferred Alternative	Aug. 2001 – Dec. 2002	16 Months
Start up of Preferred Alternative	Jan. – Dec., 2003	12 Months
Total		35 Months (~3 years)

In addition to investigating pretreatment options, AYC is considering relocating its facility out of the Tulare Lake Basin, a process that could take 18 to 24 months.

SOILS, GEOLOGY, AND HYDROLOGY

The WWTF Site is on the Kern River alluvial fan, and has a nearly constant slope of approximately 10 feet per mile from north-northeast to south-southwest. The predominant soil association (Hesperia-Hanford) in the vicinity of the WWTF Site is considered to have moderate water infiltration rates. Soil profiles from 12 onsite bore holes (to a depth of 40 feet) indicate a variable lithology but suggest that much of the site is underlain by a high clay content layer of soil, which is generally over five feet thick and at about 25 to 40 feet below ground surface (bgs). The average annual rainfall is a little less than six inches and surface runoff is mostly by sheet flow between canal levees with a general drainage to the Kern River.

Use Area soil monitoring has included monitoring for EC within the upper foot of Use Area soils. Data from 1984 through 1999 indicate that the EC of the upper foot of Use Area soils has ranged from 800 to 6,100 $\mu\text{mhos/cm}$ and averaged around 2,200 $\mu\text{mhos/cm}$. According to Western States Laboratory Proficiency Testing Program Soil and Plant Analytical Methods (1998), soils with EC values ranging from 1,600 to 2,400 $\mu\text{mhos/cm}$ are moderately saline and show yield reductions of 50 percent in the most sensitive forage and field crops, and soil with EC values exceeding 3,200 $\mu\text{mhos/cm}$ are considered very strongly saline and support only a few highly salt-tolerant grasses, herbaceous plants and certain shrubs.

In November 1996, AYC submitted a technical report, *Soil Profile Evaluation of Nitrogen Concentrations and Average Crop Root Zone* (Soil Evaluation Report) that indicates no significant accumulation of nitrogen had occurred in soils at the Use Area up to that time. While historical monitoring data indicates that nitrogen loading in 1999 reached the highest level since the project began in 1983, comparisons of soil monitoring data from the Soil Evaluation Report and AYC's 1998 annual monitoring report appear to indicate that soil nitrate and nitrogen concentrations have decreased in the

upper six feet of Use Area soils. The tables below present soil nitrate-nitrogen and total nitrogen concentrations averaged for the four-year period of 1984 to 1987 and compared to similar averages for the 4-year period of 1995 to 1998.

Soil Nitrate-Nitrogen Concentrations in Western Use Area (mg/Kg)

	W-1		W-2		W-3		W-4	
	<u>2-4 ft</u>	<u>4-6 ft</u>	<u>2-4 ft</u>	<u>4-6 ft</u>	<u>2-4 ft</u>	<u>4-6 ft</u>	<u>2-4 ft</u>	<u>4-6 ft</u>
84 - 87	12	13	13	9	5	3	8	8
95 - 98	5	3	3	2	6	4	5	5

Soil Nitrate-Nitrogen Concentrations in Eastern Use Area (mg/Kg)

	E-1		E-2		E-3		E-4	
	<u>2-4 ft</u>	<u>4-6 ft</u>	<u>2-4 ft</u>	<u>4-6 ft</u>	<u>2-4 ft</u>	<u>4-6 ft</u>	<u>2-4 ft</u>	<u>4-6 ft</u>
84 - 87	4	4	5	5	8	12	38	17
95 - 98	4	2	3	2	3	3	5	18

Soil Total Nitrogen Concentrations in Western Use Area (mg/Kg)

	W-1		W-2		W-3		W-4	
	<u>2-4 ft</u>	<u>4-6 ft</u>	<u>2-4 ft</u>	<u>4-6 ft</u>	<u>2-4 ft</u>	<u>4-6 ft</u>	<u>2-4 ft</u>	<u>4-6 ft</u>
84 - 87	700	700	600	570	910	750	730	670
95 - 98	380	430	370	200	380	400	450	470

Soil Total Nitrogen Concentrations in Eastern Use Area (mg/Kg)

	E-1		E-2		E-3		E-4	
	<u>2-4 ft</u>	<u>4-6 ft</u>	<u>2-4 ft</u>	<u>4-6 ft</u>	<u>2-4 ft</u>	<u>4-6 ft</u>	<u>2-4 ft</u>	<u>4-6 ft</u>
84 - 87	400	320	470	480	430	530	710	400
95 - 98	360	240	460	310	450	310	650	240

The data above suggests that nitrogen is not accumulating in the soil profile, despite over twenty years of annual loadings exceeding 1,500 lb/ac. Nitrogen applied in excess of agronomic demand is likely leaching to and degrading underlying groundwater if it is not lost within the soil profile (i.e., through denitrification).

GROUNDWATER

Discharger groundwater monitoring reports indicate that groundwater exists in three aquifer systems under the WWTF Site: perched (shallow), unconfined and confined. Intermittent shallow groundwater appears to be supported by the clay layer described above, unconfined groundwater is found between 140 and 180 feet bgs, and the confined groundwater lies beneath the Corcoran Clay, an approximately 50-foot-thick confining layer at about 450 feet bgs. There are no known wells in the vicinity of the WWTF that extract groundwater from the confined aquifer exclusively.

The ancient Panama Slough channel that traverses the eastern half of Section 33 appears to influence the accumulation of perched groundwater beneath the WWTF Site. The Discharger has monitored shallow groundwater EC from twelve 40-foot-deep piezometers in Section 33 since 1983. As these are often dry, year-to-year data is discontinuous. While not continuously present, shallow groundwater is frequently detected in monitoring piezometers in the southwest portion of Section 33. Depth to perched groundwater underlying the channel is usually greater than 40 feet bgs (the maximum depth of onsite piezometers). Elsewhere in Section 33, the depth to perched groundwater has also been typically greater than 40 feet bgs, although in wet years perched groundwater has risen to levels where sampling from onsite piezometers is possible. Tabulated below are Discharger data on perched groundwater EC (in $\mu\text{mhos/cm}$). Given that WWTF effluent EC is typically below 700 $\mu\text{mhos/cm}$, the high values shown below reflect the influence on underlying groundwater of the long-term discharge to the WWTF Site of highly-saline yeast plant wastewater.

<u>Piezometer</u>	<u>Aug 95</u>	<u>Jan 96</u>	<u>Dec 97</u>	<u>May 98</u>	<u>Dec 98</u>	<u>Jul 99</u>
2				3,246	1,302	1,113
4	3,140					
5			1,224	1,504		
6				1,958		
11	2,580	2,610				

The Discharger monitors the quality of unconfined groundwater in 14 unconfined groundwater wells in the vicinity of the WWTF Site (9-square-mile area surrounding Section 33); thirteen of which are privately-owned and leased by the City, while one, within Section 33, is City-owned (Monitoring Well No. 7, or MW 7). The Discharger monitors groundwater pH, EC, and concentrations of chloride and nitrate annually from these wells. Well drillers reports are available from DWR for MW 2, 3, 7, and 14 only, and with the exception of MW 7, the well drillers reports are incomplete. MW 7 is 400 feet deep with casing perforations extending from a depth of 200 to 400 feet.

Historical data for shallow and unconfined groundwater obtained between 1991 and 1999 is presented in *Summary of Groundwater Conditions in the Vicinity of Bakersfield Wastewater Treatment Plant #3* (dated September 1999 and, hereafter referred to as 1999 Summary). The 1999 Summary does not distinguish between shallow water associated with the unconfined aquifer and with accumulated 'perched' water. The 1999 Summary indicates that the depth of unconfined groundwater in the vicinity of Section 33 generally ranged from 130 to 160 feet bgs between January and July 1999.

Earlier groundwater monitoring reports provide information dating back to 1983. The reports do not provide groundwater depth or surface elevation information for most of the 14 wells monitored by the Discharger in the vicinity of the WWTF Site. The 1999 Summary presents 1998 springtime groundwater depth and surface elevation information that is compiled from other sources (i.e., Kern Delta Water District, Kern County Water Agency, and DWR). However, while this is useful supplemental information, it is presented for a 414-square-mile area and lacks sufficient information for the immediate vicinity of Section 33. Additional data on groundwater surface elevations obtained over the seasons is needed to determine groundwater flow direction and gradient, and to establish background water quality standards and downgradient boundary wells. Because the Discharger only sporadically measures groundwater depth in its unconfined groundwater monitoring wells, the Discharger's groundwater monitoring reports are not sufficiently detailed to determine the gradient and flow direction of unconfined groundwater near the boundaries of the WWTF Site. Because the treatment processes employed at the WWTF do not remove chloride to any significant extent, higher than background levels of chloride concentrations can be taken as an indication that WWTF effluent has leached into groundwater. Accordingly, based on groundwater monitoring data for chloride, it appears that the groundwater underlying the Use Area flows in a southwesterly direction.

Background groundwater quality is good with respect to mineral and nitrate content. MW 3 and MW 9 north and east of the WWTF, respectively, appear to reflect background groundwater quality. Groundwater directly under the WWTF Site is monitored in MW 7 and MW 8, north and south, respectively, of the WWTF's former aerated lagoons. MW 10 and MW 13, immediately southwest and southeast, respectively, of the southern half of Section 33, reflect downgradient groundwater quality. From 1983 through 1999, the average concentrations of EC, chloride and nitrate-nitrogen in groundwater extracted from these wells are tabulated below:

	EC (μ mhos/cm)	Chloride (mg/L)	Nitrate-nitrogen (mg/L)
Upgradient			
MW 3	266	8	0.2
MW 9	210	5	0.8
Internal			
MW 7	780	61	8.7
MW 8	694	53	1.1
Downgradient			
MW 10	712	62	1.9
MW 13	753	23	1.3

Discharger monitoring reports indicate that degradation of unconfined groundwater underlying the WWTF Site has decreased since the mid-1980s when the Discharger initiated offsite reclamation of WWTF effluent at the I-5 Site. Prior to 1983, WWTF effluent, which included treated yeast plant's process wastewater, was discharged to onsite percolation ponds prior to being recycled on the Use Area.

Groundwater quality underlying the WWTF appears to have improved, as indicated by monitoring data from MW 7 and MW 8. However, groundwater quality downgradient of the Use Area has degraded significantly in the period for which groundwater data is available, as indicated by monitoring data from MW 10 and MW 13. Tabulated below are nitrate-nitrogen, chloride, and EC concentrations averaged over two five-year periods, 1983-1987 and 1995-1999, for these four groundwater monitoring wells.

Constituent	Units	MW 7		MW 8		MW 10		MW 13	
		1983-87	1995-99	1983-87	1995-99	1983-84	1995-99	1983-84	1995-99
Nitrate	mg/L as N	12	8	2	0	2	3	1	1
Chloride	mg/L	84	50	74	39	51	82	46	64
EC	µmhos/cm	924	646	920	650	600	820	782	733

As indicated above, the concentrations of chloride and EC have increased significantly in groundwater passing through MW 10 immediately southeast of the Use Area. A similar increase in groundwater chloride concentration is noted for MW 13 immediately southwest of the Use Area.

The long-term discharge to the Use Area of both WWTF effluent and, more significantly, of yeast plant wastewater, has increased the salinity of Use Area soils and has degraded groundwater quality for EC, chloride and nitrate-nitrogen. Because all the monitoring wells that comprise the Discharger's existing groundwater monitoring well network extract from the entire depth of the unconfined aquifer, the magnitude of the degradation of the uppermost unconfined aquifer for EC, chloride and nitrate-nitrogen, is likely to be significantly greater than that indicated by Discharger self-monitoring data. In effect, the Discharger has, over the years, avoided seeing the affect of the joint discharge by using a significant dilution credit in evaluating the impact of WWTF and Use Area operations on area groundwater.

Basin Plan, Beneficial Uses, and Board Policies

The *Water Quality Control Plan for the Tulare Lake Basin, Second Edition* (hereinafter Basin Plan) designates beneficial uses and contains water quality objectives for all waters of the Basin. Beneficial uses often determine the water quality objectives that apply to a water body. For example, waters designated as municipal and domestic supply must meet the maximum contaminant levels (MCLs) for drinking waters. The Basin Plan sets forth the applicable beneficial uses (industrial, agricultural, and domestic supply in this instance), procedure for application of water quality objectives, and the process for and factors to consider in allocating waste assimilation capacity.

The Basin Plan identifies existing and potential beneficial uses of the Kern River below the Southern California Edison Kern River Powerhouse No. 1 as municipal and domestic supply, agricultural supply, industrial service supply, industrial process supply, hydropower generation, water contact recreation, noncontact water recreation, warm freshwater habitat, wildlife habitat, rare, threatened, or endangered species habitat, and groundwater recharge.

The Basin Plan indicates that degradation of groundwater in the Tulare Lake Basin by salts is unavoidable without a plan for removing the salts from the Basin. In the absence of a valley wide drain

to carry salts out of the valley, the Basin Plan indicates that the only other solution is to manage the rate of degradation by minimizing the salt loads to groundwater. The Board implements this policy, in part, by prescribing effluent salinity limits in waste discharge requirements for all discharges to land in the Basin. The Basin Plan's discharge salinity limit consists of narrative and numerical limits:

“The incremental increase in salts from use and treatment must be controlled to the extent possible. The maximum EC shall not exceed the EC of the source water plus 500 $\mu\text{mhos/cm}$. When the source water is from more than one source, the EC shall be a weighted average of all sources.”

The Basin Plan encourages reclamation and does not consider disposal by evaporation/percolation or discharge to surface waters a permanent disposal solution when the potential exists for reclamation. Further, the Basin Plan requires that project reports for new or expanded wastewater facilities shall include plans for wastewater reclamation or the reasons why this is not possible.

Further, the California Department of Health Services (DHS) has established statewide reclamation criteria in Title 22, California Code of Regulations (CCR), section 60301 et seq., (hereafter Title 22), and guidelines for use of recycled water. Revised Title 22 water recycling criteria became effective on 2 December 2000. The revised Title 22 expands the range of allowable uses of recycled water, establishes criteria for these uses, and clarifies some of the ambiguity contained in the previous regulations. Further, the revised Title 22 requires that all wastewater used for reclamation receive, at a minimum, secondary treatment. However, Title 22 does not define secondary treatment with respect to numerical limits for BOD₅ and total suspended solids. According to DHS, for uses not requiring disinfection, treated wastewater should, at a minimum, be adequately oxidized, contain dissolved oxygen near saturation levels, and be nonputrescible when applied to land. The Basin Plan's secondary treatment performance standard meets the minimum Title 22 treatment requirements.

Antidegradation

The antidegradation directives of section 13000 of the California Water Code require that waters of the State that are better in quality than established water quality objectives be maintained “consistent with the maximum benefit to the people of the State.” Waters can be of high quality for some constituents or beneficial uses and not others. Policies and procedures for complying with this directive are set forth in the Basin Plan (including by reference State Water Board Resolution No. 68-16, “Statement of Policy With Respect to Maintaining High Quality Waters in California,” or “Antidegradation” Policy).

Resolution 68-16 is applied on a case-by-case, constituent-by-constituent basis in determining whether a certain degree of degradation can be justified. It is incumbent upon the Discharger to provide technical information for the Board to evaluate that fully characterizes:

- all waste constituents to be discharged, the background quality of the uppermost layer of the uppermost aquifer
- the background quality of other waters that may be affected
- the underlying hydrogeologic conditions

- waste treatment and control measures
- how treatment and control measures are justified as best practicable treatment and control
- the extent the discharge will impact the quality of each aquifer
- the expected degradation compared to water quality objectives

In allowing a discharge, the Board must comply with CWC section 13263 in setting appropriate conditions. The Board is required, relative to the groundwater that may be affected by the discharge, to implement the Basin Plan and consider the beneficial uses to be protected along with the water quality objectives essential for that purpose. The Board need not authorize the full utilization of the waste assimilation capacity of the groundwater (CWC 13263(b)) and must consider other waste discharges and factors that affect that capacity. The applicable beneficial uses (industrial, agricultural, and domestic supply in this instance), procedure for application of water quality objectives, and the process for and factors to consider in allocating waste assimilation capacity are set forth in the Basin Plan.

This discharge has been occurring for years. Previous conditions of discharge have specified that neither the treatment nor discharge shall cause a pollution or nuisance. Certain waste constituents in municipal wastewater are not fully amenable to waste treatment and control and it is reasonable to expect some impact on groundwater. Some degradation for certain constituents is consistent with maximum benefit to the people of California because the technology, energy, water recycling, and waste management advantages of municipal utility service to the State far outweigh the environmental impact damage of a community that would otherwise be reliant on numerous concentrated individual wastewater systems. Economic prosperity of valley communities is of maximum benefit to the people of California, and therefore sufficient reason to accommodate increases in wastewater discharge provided terms of reasonable degradation are defined and met. The proposed Order authorizes some degradation consistent with the maximum benefit to the people of the State.

Groundwater monitoring data at this site is insufficient to establish the most appropriate receiving water limits. In addition, as explained elsewhere in this information sheet, certain aspects of waste treatment and control practices have not been and are unlikely to be justified as representative of BPTC. Reasonable time is necessary to gather specific information about the facility and the site to make informed, appropriate, long-term decisions. This proposed Order, therefore, establishes interim receiving water limitations to assure protection of the beneficial uses of waters of the State pending the completion of certain tasks and provides time schedules to complete specified tasks. The tasks provide that the Discharger is expected to identify, implement, and adhere to best practicable treatment and control as individual practices are reviewed and upgraded in this process. During this period, degradation may occur from certain constituents, but by interim conditions can never exceed water quality objectives (or background water quality should it exceed objectives) or cause nuisance.

Water quality objectives define the least stringent limits that could apply as water quality limitations for groundwater at this location, except where background quality unaffected by the discharge already exceeds the objective. The values below reflect water quality objectives that must be met to maintain specific beneficial uses of groundwater. Unless natural background for a constituent proves higher, the

groundwater quality limit established in the proposed Order is the most stringent of the values listed for the listed constituents.

<u>Constituent</u>	<u>Units</u>	<u>Value</u>	<u>Beneficial Use</u>	<u>Criteria or Justification</u>
Ammonia	mg/L	0.5	MUN ¹	Taste and Odor ²
Chloride	mg/L	106	AGR ³	Chloride sensitivity on certain crops irrigated via sprinklers ⁴
		142	AGR ³	Chloride sensitivity on certain crops ⁴
		250	MUN ¹	Recommended Secondary MCL ⁵
		500	MUN ¹	Upper Secondary MCL ⁵
Conductivity (EC)	µmhos/cm	750	AGR ³	Salt sensitivity ⁴
		900	MUN ¹	Recommended Secondary MCL ⁵
		1,600	MUN ¹	Upper Secondary MCL ⁵
Iron	mg/L	0.3	MUN ¹	Secondary MCL ⁶
Manganese	mg/L	0.05	MUN ¹	Secondary MCL ⁶
Nitrate as N	mg/L	10	MUN ¹	Primary MCL ⁷
Nitrite as N	mg/L	1	MUN ¹	Primary MCL ⁷
Sodium	mg/L	69	AGR ³	Sodium sensitivity on certain crops ⁴
Total Coliform Organisms	MPN/100 ml	2.2	MUN ¹	Basin Plan
Total Dissolved Solids	mg/L	450	AGR ³	Salt sensitivity ⁴
		500	MUN ¹	Recommended Secondary MCL ⁵
		1,000	MUN ¹	Recommended Upper MCL ⁵
Total Trihalomethanes	µg/L	100	MUN ¹	MCL ⁸
pH	pH Units	6.5 to 8.5	MUN ¹	Secondary MCL ⁹
See footnotes next page				

- 1 Municipal and domestic supply
- 2 Council of the European Union, On the Quality of Water Intended for Human Consumption, Council Directive 98/83/EC (3 November 1998).
- 3 Agricultural supply
- 4 Ayers, R. S. and D. W. Westcot, Water Quality for Agriculture, Food and Agriculture Organization of the United Nations – Irrigation and Drainage Paper No. 29, Rev. 1, Rome (1985)
- 5 Title 22, California Code of Regulations (CCR), section 64449, Table 64449-B
- 6 Title 22, CCR, section 64449, Table 64449-A
- 7 Title 22, CCR, section 64431, Table 64431-A
- 8 Title 22, CCR, section 64439
- 9 United States Environmental Protection Agency

Municipal wastewater contains numerous dissolved inorganic waste constituents (i.e., salts, minerals) that together comprise total dissolved solids (TDS). Each component constituent is not individually critical to any beneficial use. Constituents that are critical are individually listed. The cumulative impact from these other constituents, along with the cumulative affect of the constituents that are individually listed can be effectively controlled using TDS as a generic indicator parameter.

Treatment Technology and Control

Given the character of municipal wastewater, secondary treatment technology is generally sufficient to control degradation of groundwater from decomposable organic constituents. Adding disinfection significantly reduces populations of pathogenic organisms, and reasonable soil infiltration rates and unsaturated soils can reduce them further. Neither organics nor total coliform, the indicator parameter for pathogenic organisms, should be found in groundwater in a well-designed, well-operated facility. Hence, the groundwater limits proposed for these constituents are nondetect, which is less than the water quality objective.

Chlorine disinfection of effluent causes formation of trihalomethanes, which are priority pollutants. Treatment to reduce these in wastewater generally has not been performed, and little is known at this point on the typical impact on groundwater. The proposed limitation is based on the water quality objective for maintaining the beneficial use of area groundwater as a source of low chloride irrigation supply.

Municipal wastewater typically contains nitrogen in concentrations greater than water quality objectives, which vary according to the form of nitrogen. Degradation by nitrogen can be controlled by an appropriate secondary treatment system (e.g., oxidation ditch), tertiary treatment for nitrogen reduction, and agronomic reuse on harvested crops. The effectiveness varies, but generally best practicable treatment and control should be able to control nitrogen degradation at a concentration well below the water quality objectives. The proposed interim limitation reflects water quality objectives.

Waste constituents that are forms of salinity pass through the treatment process and soil profile and effective control of long-term affects relies upon effective source control and pretreatment measures. In the best of circumstances, long-term land discharge of treated municipal wastewater will degrade

groundwater with salt (as measured by TDS and EC) and the individual components of salts (e.g., sodium, chloride). Not all TDS constituents pass through the treatment process and soil profile in the same manner or rate. Chloride tends to pass through both rapidly to groundwater. As chloride concentrations in most groundwaters in the region are much lower than in treated municipal wastewater, chloride is a useful indicator parameter for evaluating the extent to which effluent reaches groundwater.

The proposed Order sets water quality objectives for the interim while site-specific, constituent-specific limits are developed in conjunction with a BPTC evaluation of source control and pretreatment. The next Order will likely contain effluent limits for salt components that, if met, assure groundwater quality will be controlled to an acceptable level.

Other indicator constituents for monitoring for groundwater degradation due to recharged effluent include total coliform bacteria, ammonia, total nitrogen, and total trihalomethanes (when the effluent is chlorinated). Boron is another TDS constituent that may occur in wastewater in concentrations greater than groundwater depending on the source water, to the extent residents use cleaning products containing boron, and whether any industrial dischargers utilize boron (e.g., glass production, cosmetics). Still other constituents in treated municipal waste that may pass through the treatment process and the soil profile include recalcitrant organic compounds (e.g., ethylene glycol, or antifreeze), radionuclides, and pharmaceuticals. Hazardous compounds are not usually associated with domestic wastes and when present are reduced in the discharge to inconsequential concentrations through dilution with domestic waste, treatment, and the implementation of effective pretreatment programs. It is inappropriate to allow degradation of groundwater with such constituents, so proposed limitations are nondetect.

A discharge of wastewater that overloads soils with nutrients and organics can result in anaerobic conditions in the soil profile, which in turn creates organic acids and decreases soil pH. Under conditions of low soil pH (i.e., below 5), iron and manganese compounds in the soil can solubilize and leach into groundwater. Discharge of residual sludge to land may also lead to increases in groundwater alkalinity and hardness to concentrations that impair the water's beneficial uses and contribute to an overall increase in TDS. Overloading is preventable and does not constitute BPTC as used in Resolution 68-16. Dissolved iron and manganese, along with elevated alkalinity, hardness and nitrogen concentrations, are useful indicators to determine whether components of the WWTF with high-strength waste constituents, such as sludge handling facilities, are ineffective in containing waste. Though iron and manganese limits are set at the water quality objective, groundwater pH is expected to remain the same as background.

Title 27

Title 27, CCR, section 20380 et seq. ("Title 27"), contains regulations to address certain discharges to land. Title 27 establishes a waste classification system, specifies siting and construction standards for full containment of classified waste, requires extensive monitoring of groundwater and the unsaturated zone for any indication of failure of containment, and specifies closure and post-closure maintenance requirements. Generally, no degradation of groundwater quality by any waste constituent is acceptable.

Discharges of domestic sewage and treated effluent can be treated and controlled to a degree that will not result in unreasonable degradation of groundwater. For this reason, they have been conditionally exempted from Title 27, except for residual sludge and solid waste generated as part of the treatment

process [section 20090(a) of Title 27]. The condition requires that the discharge not result in violation of any water quality objective in groundwater.

Treatment and storage facilities for sludge that are part of the WWTF are considered exempt from Title 27 under section 20090(a), under the condition that the facilities not result in a violation of any water quality objective. However, residual sludge (for the purposes of the proposed order, sludge that will not be subjected to further treatment by the WWTF) is not exempt from Title 27. Solid waste (e.g., grit and screenings) that results from treatment of domestic sewage and industrial waste also is not exempt from Title 27. This residual sludge and solid waste are subject to the provisions of Title 27.

Accordingly, the municipal discharge of effluent and the operation of treatment or storage facilities associated with a municipal wastewater treatment plant can be allowed without requiring compliance with Title 27, but only if resulting degradation of groundwater is in accordance with the Basin Plan. This means, among other things, degradation of groundwater must be consistent with Resolution 68-16 and in no case greater than water quality objectives. The conditions for sludge, solid waste, and biosolids management proposed in the interim Order are intended to assure this and must all be evaluated along with other aspects of BPTC.

PROPOSED ORDER TERMS AND CONDITIONS

Discharge Prohibitions, Specifications and Provisions

Existing WDRs contain 30-day average effluent limits for BOD₅ and CBOD of 40 mg/L and 35 mg/L, respectively, and specify that the Discharger may demonstrate compliance with secondary treatment requirements using either BOD₅ or CBOD analysis. The CBOD laboratory method inhibits nitrogenous oxygen demand and is always less than BOD₅. Such a limit would be less stringent than a BOD₅ limit and is inconsistent with Basin Plan objectives for municipal discharges in excess of 1.0 mgd. A conference memorandum for a 26 July 1996 expansion plan review meeting between Board staff and the Discharger's engineering consultant indicates that the Discharger was informed that the future Order (this one) would contain a BOD₅ limit of 40 mg/L and no allowance for compliance based on CBOD. The memorandum indicates that the expanded WWTF would be designed (sized) and operated to achieve compliance with such a limit.

The proposed Order implements the Basin Plan salinity limitation by requiring the monthly average effluent EC to remain less than the flow-weighted average EC of the source water plus 500 µmhos/cm. The average WWTF effluent EC currently is approximately 654 µmhos/cm. The 40 mg/L monthly average BOD₅ and total suspended solids effluent limits in the proposed Order are based on the Basin Plan's treatment level standards for discharges to land for facilities treating more than 1.0 mgd. The WWTF effluent BOD₅ averaged 47 mg/L following completion of the expansion project (April to October 1999), and for 2000 the average BOD₅ concentration was 45 mg/L. City personnel indicated that the WWTF is unable to meet the proposed Order's BOD₅ effluent limit of 40 mg/L. The WWTF was designed to treat a BOD₅ influent concentration of 304 mg/L, while the average influent BOD₅ concentration was 366 mg/L in 1999 and 396 mg/L in 2000. The City indicated it is currently studying

alternative methods for bringing the WWTF into compliance with the proposed Order's BOD₅ effluent limit that will require \$7 to \$8 million in WWTF modification costs and four years to complete. The proposed Order's interim CBOD effluent limit will serve as a temporary alternative treatment standard until the Discharger completes its WWTF modifications by 15 April 2005. The proposed Order's discharge specifications for dissolved oxygen and pH of effluent stored in the WWTF's effluent storage reservoir/equalization lagoon are consistent with Board policy for the proper operation of a wastewater treatment facility and for the prevention of nuisance conditions, and are applied to all such facilities.

The proposed Order's reclamation specifications are consistent with Title 22 and the reclamation policies stated in the Basin Plan. Most reclamation specifications further limit the amount of nitrogen applied to reclamation area crops to agronomic rates (i.e., less than 500 lb/ac, depending on the crop and crop rotation). The existing WDRs for the Use Area do not. The proposed Order limits the amount of nitrogen applied annually to the Use Area to crop agronomic uptake rates and prescribes an EC limitation for all wastewater of 500 µmhos/cm over source water effective January 2005. The long-term effect of the discharge of yeast plant and city wastewater to the Use Area appears to have degraded area groundwater for EC (as indicated by shallow piezometer monitoring data).

The proposed Order requires the Discharger to submit a workplan for the reduction of AYC's discharge of waste to the Use Area, along with an implementation schedule that requires the reduction to begin in January 2002 and to either cease entirely by January 2005 or comply with the proposed Order's agronomic loading requirement and discharge EC limitation.

As described previously, the proposed Order prescribes interim limitations to protect area groundwater for existing and anticipated beneficial uses until the Discharger proposes for Board consideration site-specific, constituent-specific limits in conjunction with a demonstration of BPTC of source control, pretreatment, treatment and effluent disposal. Groundwater in the WWTF vicinity is currently used for domestic, industrial and agricultural beneficial uses. Urban growth in the Bakersfield environs may necessitate use of area groundwater for municipal supply. To protect these existing and anticipated uses, the proposed Order's limitations are equivalent to water quality objectives necessary for area groundwater to continue to be an anticipated source of domestic and municipal supply. To ensure protection of area groundwater for municipal and domestic beneficial uses, the proposed Order's limitations are equivalent to drinking water standards for nitrate-nitrogen, iron, manganese, and Total Trihalomethanes, and the recommended levels for TDS and EC. The ammonia-nitrogen limitation is based on the taste- and odor-threshold for human consumption. Further, the proposed Order prescribes a narrative groundwater limitation that requires that the discharge not impart taste, odor, or color that creates nuisance.

Present and anticipated agricultural land uses in the WWTF vicinity may include sprinkler or flood irrigation of chloride-sensitive crops (e.g., trees) or irrigation of salt-sensitive crops (e.g., beans and carrots). The proposed Order prescribes a narrative groundwater limitation that requires the discharge to not cause area groundwater to contain concentrations of chemical constituents in amounts that adversely affect agricultural uses.

Monitoring Requirements

Section 13267 of the CWC authorizes the Board to require monitoring and technical reports as necessary to investigate the impact of a waste discharge on waters of the state. In recent years there has been increased emphasis on obtaining all necessary information, assuring the information is timely as well as representative and accurate, and thereby improving accountability of any discharger for meeting the conditions of discharge. Section 13268 of the CWC authorizes assessment civil administrative liability where appropriate.

The proposed Order prescribes monitoring of discharge BOD₅, CBOD₅, TSS, pH, and EC. The monitoring of these constituents is necessary to check compliance with discharge specifications. The proposed Order also prescribes monitoring of discharge nitrogen (as nitrite, nitrate, TKN, and total nitrogen), quarterly monitoring of minerals and metals, and annual monitoring of source water quality.

The proposed Order requires monitoring and reporting of the mass loading of fixed total dissolved solids from the combined discharge to the Use Area of WWTF effluent and yeast waste. While the proposed Order does not require the Discharger to monitor the salinity components of yeast waste discharged to the Use Area, it does require the Discharger to report the cumulative fixed TDS load from the discharge of yeast waste to the Use Area. The Monitoring and Reporting Program for WDRs Order No. 83-016 for the discharge of yeast waste to the Use Area was revised to increase the number of constituents monitored in the yeast plant's discharge, including fixed TDS, and to require reporting of fixed TDS loading. As the TDS of yeast waste is much greater than WWTF effluent, it is unlikely that the Discharger will be able to comply with the proposed Order's Use Area salinity load limit until all yeast plant discharge ceases by 1 January 2003.

The Title 27 zero leakage protection strategy relies heavily on extensive groundwater and unsaturated zone monitoring to increase a discharger's awareness of, and accountability for, compliance with the prescriptive and performance standards. With a high volume, concentrated, uncontained discharge to land, monitoring takes on even greater importance. The proposed Order includes monitoring of applied waste quality, application rates, and groundwater.

Title 27 regulations pertaining to groundwater monitoring and the detection and characterization of waste constituents in groundwater have been in effect and successfully implemented for many years. No regulation currently specifies similar criteria more suitable for a situation where extensive infiltration

into groundwater occurs. However, where, as here, such infiltration occurs, it is appropriate that the Title 27 groundwater monitoring procedures be extended and applied on a case-by-case basis under Water Code section 13267.

The proposed Order requires installation of an effective monitoring network that includes monitoring points represented by wells forming a vertical line that extends from the soil surface into the uppermost layer of water in the uppermost aquifer. One or more wells will monitor the quality of groundwater unaffected by the discharge and serve as 'background.' Other monitoring wells will be for determining compliance with Groundwater Limitations E.1, E.2 and E.3.

The Discharger must monitor groundwater for constituents present in the discharge and capable of reaching groundwater and violating groundwater limitations if its treatment and control, and any dependency of the process on sustained environmental attenuation, proves inadequate. As some groundwater limitations are based on background water quality, it is essential that the discharger install wells in a location that can provide groundwater quality representative of the discharge area but unaffected by both the discharge and other waste sources. The proposed Order requires the Discharger to install such well(s) and characterize background water quality over a one-year period of quarterly groundwater sampling events. For each constituent where no increase in concentration is authorized over background, the Discharger must, as part of each monitoring event, compare concentrations of constituents found in each monitoring well to the background concentration to determine compliance.

Reopener

The conditions of discharge in the proposed Order were developed based on currently available technical information and applicable water quality laws, regulations, policies, and plans, and are intended to assure conformance with them. However, information is presently insufficient to develop final effluent and groundwater limitations, so the proposed Order contains interim limitations. Additional information must be developed and documented by the Discharger as required by schedules set forth in the proposed Order. As this additional information is obtained, decisions will be made concerning the best means of assuring the highest water quality possible and that could involve substantial cost. It may be appropriate to reopen the Order if applicable laws and regulations change, but the mere possibility that such laws and regulations may change is not sufficient basis for reopening the Order. The CWC requires that waste discharge requirements implement all applicable requirements.

DSS/jlk:4/27/01 AMENDED